UNIVERSITY OF HAWAI'I LIBRARY

5-3

Rhodora

JOURNAL OF THE

NEW ENGLAND BOTANICAL CLUB

Conducted and published for the Club, by

MERRITT LYNDON FERNALD, Editor-in-Chief

JAMES FRANKLIN COLLINS
CHARLES ALFRED WEATHERBY } Associate Editors
LUDLOW GRISCOM

Vol. 37. August, 1935. No. 440.

CONTENTS:

Further Notes on Past Periods of Eelgrass Scarcity. *Clarence Cottam* 269
Critical Plants of the Upper Great Lakes Region of Ontario and Michigan (continued). *M. L. Fernald* 272
Tillaea aquatica on Long Island. *H. K. Svenson* 301
Notes on the Northern Range of Zizania in Manitoba. *A. L. Hallowell* 302
Lichen Flora of the United States (Review). *S. K. Harris* 305
Victorin's Flore Laurentienne (Review). *M. L. F.* 305
Praeger's Botanist in Ireland (Review). *M. L. F.* 308
Listera australis on Long Island. *H. K. Svenson* 308

The New England Botanical Club, Inc.
8 and 10 West King St., Lancaster, Pa.
Room 1001, 53 State St., Boston, Mass.

K
R47

RHODORA.—A monthly journal of botany, devoted primarily to the flora of New England. Price, $2.00 per year, net, postpaid, in funds payable at par in United States currency in Boston; single copies (if available) 20 cents. Volumes 1–8 or some single numbers from them can be supplied only at advanced prices which will be furnished on application. Notes and short scientific papers, relating directly or indirectly to the plants of the northeastern states, will be considered for publication to the extent that the limited space of the journal permits. Forms will be closed five weeks in advance of publication. Authors (of more than two pages of print) will receive 25 copies of the issue in which their contributions appear. Extracted reprints, if ordered in advance, will be furnished at cost.

Address manuscripts and proofs to
M. L. FERNALD, 14 Hawthorn Street, Cambridge, Mass.

Subscriptions (making *all remittances* payable to RHODORA) to
Ludlow Griscom, 8 W. King St., Lancaster, Pa., or Museum of Comparative Zoology, Cambridge, Mass.

Entered at Lancaster, Pa., Post Office as Second Class Mail Matter.

INTELLIGENCER PRINTING COMPANY
Specialists in Scientific and Technical Publications
EIGHT WEST KING ST., LANCASTER, PA.

CARD-INDEX OF NEW GENERA, SPECIES AND VARIETIES OF AMERICAN PLANTS, 1885 TO DATE.

For American taxonomists and all students of American plants the most important supplement to the Index Kewensis, this catalogue in several ways exceeds the latter work in detail, since it lists not only the flowering plants, but ferns and other vascular cryptogams, and includes not merely genera and species, but likewise subspecies, varieties and forms. A work of reference invaluable for larger herbaria, leading libraries, academies of sciences, and other centers of botanical activity. Issued quarterly, at $22.50 per 1000 cards.

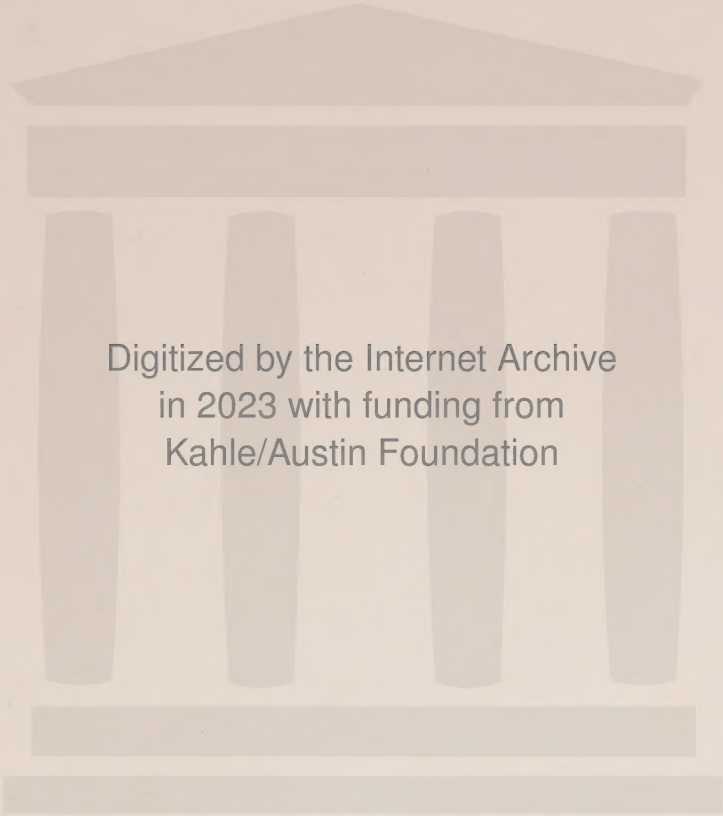
GRAY HERBARIUM of Harvard University,
Cambridge, Mass., U. S. A.

CHECK LIST OF GRAY'S MANUAL, 7th EDITION, compiled by M. A. DAY. Leatherette. Pocket size. Invaluable for collector's memoranda and herbarium records. Published and sold by the GRAY HERBARIUM, Cambridge, Mass. Price postpaid 20 cts. each. Ten copies $1.50.

MEMOIRS OF THE GRAY HERBARIUM. A series of illustrated quarto papers issued at irregular intervals, sold separately.

No. III. The Linear-leaved North American Species of Potamogeton, Section Axillares, by M. L. Fernald. 183 pp., 40 plates, 31 maps. 1932. $3.00.

Gray Herbarium of Harvard University, Cambridge, Mass.



Digitized by the Internet Archive
in 2023 with funding from
Kahle/Austin Foundation

https://archive.org/details/rhodora_1935-08_37_440

Photo. H. G. Fernald.

RUBUS PARVIFLORUS, × 1/10, ON KEWEENAW PENINSULA.

Rhodora

JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 37. August, 1935. No. 440.

FURTHER NOTES ON PAST PERIODS OF EELGRASS SCARCITY

Clarence Cottam

Since my paper on Past Periods of Eelgrass Scarcity was published in Rhodora (Vol. **33**, pp. 261–264), July, 1934, a few more records have been obtained. A factor of wide distribution appears to have been responsible for some of these records while peculiar local conditions seem adequate to account for other periods of local subnormal production. All evidence still indicates that probably no period of eelgrass scarcity in the history of our country can be compared in intensity, duration, or completeness with the present catastrophe. Additional evidence further indicates that the 1893–94 period was one of general scarcity of the plant along the Atlantic coast of North America. Furthermore, the conditions at that time seem to have been more unfavorable than those of any other period except the present one, which became so widespread and complete in 1931–32 and has continued to the present.

In Rod and Gun in Canada, February, 1934 (Vol. **35**, No. 9, p. 20) C. I. McNab, writing of early conditions of marine wild fowl, says, "Regarding the disappearance of eelgrass, I remember about forty years ago [1893–94] the eelgrass disappeared in a similar manner [as it has done since 1931], but I cannot recall what effect it had on game and rifle. It took five or six years to get back to normal again and I believe that within the two years we shall have a good supply." This confirms records given in the summary above referred to and it also coincides with numerous verbal reports of many of the older coastal fishermen and sportsmen with whom I have recently conversed.

In a letter of January 25, 1935, Dr. Robert Lami, Assistant in the Laboratoire de Cryptogamie, Paris, France, gives further support to

our data that the period 1893–94 was one of wide destruction of eelgrass. He states that in France it seems likely that an important period of eelgrass diminution occurred 40 years ago; however, he assures us that it was less complete than the present one and not so extensive. He further reports that in a large bay in Portugal where a part of the people earn their living from the gathering and marketing of eelgrass there has never in the memory of man been a period of scarcity.

New evidence suggests the possibility that abnormal local conditions may have been responsible for the local diminution of *Zostera*. Among these factors may have been extreme cold, which may have caused the ice to cut the green leaves of the plant and so retard growth in certain shallow areas; or severe storms, which may have covered shoals with sand or cut new inlets, thereby abruptly increasing the salinity in an area where the particular flora was adapted to quite different conditions.

Lord Ilchester, in "Swans and Grass Wrack," The Field (London), October 21, 1933, 162 (4217): 1037, gives examples of diminution of the plant in the British Isles resulting from extreme cold weather. In refuting an earlier article that appeared in the same magazine attributing a previous scarcity of *Zostera* to the disease that is now believed to be responsible for the present malady, he states that in the winter of 1878–1879 and also 1880–1881 extreme and unprecedented cold caused widespread destruction of the plant along the shallow coastal section of Great Britain and that he did not believe this was traceable to any other factor.

While doing recent field work along our Atlantic coast from southern North Carolina to the Bay of Fundy between the eastern extremity of Maine and Nova Scotia, I received numerous but often vague and indefinite reports of past periods wherein there was a scarcity, or at least a subnormal crop, of eelgrass. One of these reports was of more than ordinary interest. R. C. Walker, who formerly lived at Ocean City, Md., told of an abrupt decrease of the plant in Isle of Wight and Assawoman Bays in 1921 following a very severe storm, which made new inlets connecting the bays with the ocean. He stated that the plant was more than two years in recovering. It seems probable that the abrupt increase of salinity, and perhaps also shifting ocean sands, rather than disease may have destroyed or retarded the growth of plants accustomed to more dilute concentrations of sea water. Mr. Butcher in writing in the Journal du Conseil (Vol. 9, No. 1, April,

1934, Conseil Permanent International pour l'Exploration de la Mer; Zostera, Report on the present condition of Eelgrass on the coast of England, pp. 49–65) states that two definite periods of decrease in *Zostera* can be distinguished. One of them was immediately after the war (about 1920) and the other in 1931–32 when the plant so nearly disappeared from the American Atlantic coast. The first period of diminution was gradual and therefore not widely noticed while the second was abrupt and more widespread and therefore more conspicuous.

In the abstracts of the proceedings of the Linnean Society of New York for 1931 and 1932, published November 15, 1934 (pp. 40–43), Charles A. Urner, in writing of the eelgrass blight of the New Jersey coast, states that in Barnegat Bay he noticed "as early as 1929 that the drift was reducing in volume and that the dense beds of floating eelgrass in the cover, attractive as a feeding ground to many shorebirds, were becoming less extensive each summer." He stated, however, that the greatest damage to the eelgrass occurred in 1931 and 1932.

From recent observations along the coast it is apparent that in most sections conditions are still very unsatisfactory. Areas of reduced salinity in most places are making the best return. Improvement also is more noticeable in the southern half of the eelgrass range than it is farther north.

Chesapeake Bay shows an encouraging change, with a few localized areas fast approaching the normal. A progressive improvement for more than a year also has been noted in Shinnecock and Mecox Bays, Long Island, N. Y., while a less noticeable improvement is found in Pamlico Sound and Swanquarter Bay, North Carolina. Most of the more open coastal bays from Virginia northward showed little improvement during the past year. In a few areas conditions are worse than they were a year ago, while many others show little or no change. Considering the coastal area as a whole some improvement is noticeable, with the best progress in areas of reduced salinity and in more southern latitudes. Reports from several countries of Europe indicate that eelgrass conditions are still very bad there, yet perhaps slightly improved over those noted a year ago. The causative factor or factors for this unprecedented catastrophe are not positively known, though the evidence seems to point to a fungoid disease, possibly a Mycetozoan.

U. S. Biological Survey,
Washington, D. C.

CRITICAL PLANTS OF THE UPPER GREAT LAKES REGION OF ONTARIO AND MICHIGAN

M. L. Fernald

(*Continued from page 262*)

Crataegus Douglasii Lindl.. Ontario: shore of Lake Superior, Agawa Bay, Algoma Distr., *Pease*, no. 18,050. Michigan: wind-swept sandstone-conglomerate crest of Lookout Mt., Keweenaw Co., no. 3374.

Already known from northern Michigan, from Michipicoten Island, Lake Superior (Thunder Bay Distr., Ontario) and from Abitibi River (between outlet of Lake Abitibi and mouth of Black River—Nat. Herb., Ottawa) in Cochrane District. Otherwise known as a typical shrub or small tree of the Pacific slope (California to southern British Columbia) eastward across Idaho to western Montana and Wyoming.

Map 14. Range (generalized) of Rubus parviflorus, including all Varieties.

Rubus parviflorus and its Varieties (Plates 363–365).—The beautiful white-flowered *Rubus parviflorus* Nutt. (Plate 363), the "Thimbleberry" of the Upper Great Lakes region, is there isolated from the Black Hills and the Rocky Mountains, whence it extends to the Pacific, where it is ~~better~~ known as "Salmon Berry." Realizing the improbability that a species of *Rubus* would remain constant or unvarying over the vast and diverse area (map 14) from the coast of southern Alaska to southern California and throughout much of the cordilleran region southward into Mexico and isolated about the Upper Great Lakes, I have felt it important to study with care the large accumulation of material in the Gray Herbarium; and as the study progressed I have borrowed the material from the two Great Lakes states most concerned, Michigan and Wisconsin, and here express my appreciation to Professors Ehlers, Darlington and Fassett for the use of the extensive collections in their charge, which have proved indispensable in working out the variations which reach "the Manual range." It would have been advantageous to see more extensive collections from the Rocky Mountain area and the Pacific slope but the immediate problem chiefly concerned the shrub of Ontario, Michigan, Wisconsin and Minnesota; and the treatment here proposed may readily be adapted to the more continuous western region.

Focke, treating the species as *Rubus nutkanus* Moçino (1825) instead of *R. parviflorus* Nutt. (1818), recognized three varieties but, even with these removed, he described the inflorescence with "setae glanduliferae nunc flexilis, longae, glutinosa, nunc brevissimae, ita ut glandulae subsessiles evadant."[1] And Rydberg, although separating *R. parviflorus* and *R. odoratus* L. as a genus *Rubacer* Rydb. (1903), set off from *R. parviflorus* only one of its eight components and that as a species, *Rubacer tomentosum* Rydb., a renaming of *Rubus velutinus* Hook. & Arn. (1832), not Vest (1823). For the remaining highly variable elements of *Rubus parviflorus* Rydberg described the "inflorescence more or less glandular hispid and often more or less puberulent,"[2] overlooking the significant fact that the "more . . . glandular" inflorescences do not occur in the Rocky Mountains, while the "less glandular" ones (to the extent of complete loss of glands) are restricted to the Rocky Mountain region and are absent from the Pacific coastal region and from the Great Lakes area.

In fact, a study of the indument of pedicels, calyx and leaf-surfaces

[1] Focke, Biblioth. Bot. lxxii. 124 (1911).
[2] Rydb. N. Am. Fl. xxii. 426 (1913).

shows that *Rubus parviflorus* consists of at least eight more or less localized trends, quite comparable with the geographic varieties of *R. idaeus*,[1] which Rydberg, in the North American Flora, maintains as twelve species separated on parallel differences in the indument. It is, furthermore, a disconcerting but indisputable fact that these very differences in the distribution of glands in the inflorescence and of pilosity on the calices, branches and leaves or the absence of glands and pilosity from these areas, which mark the eight geographic segregates of *Rubus parviflorus*, are precisely the characters which are shuffled and reshuffled to add to the ever increasing score of "species" of Blackberry (*Rubus* § *Eubatus*)! In *R. parviflorus* not even our most ardent advocates of specific segregation, who have felt competent to make generic segregates, have noticed them; nevertheless, they are quite as conspicuous in *R. parviflorus* as in segregates of *Rubus* § *Eubatus*, and if their phylogenetic importance is of equal value in the two sections, the Blackberries are eventually due for a pretty drastic realignment.

The greatest extremes in the series of intergrading varieties of *Rubus parviflorus* are var. *velutinus* (Hook. & Arn.) Greene (PLATE 364, FIGS. 3 and 4) and var. *scopulorum* (Greene) (PLATE 364, FIG. 5). The former has the leaves pilose on both surfaces, very densely so and somewhat whitened beneath; the branchlets and pedicels long-pilose or villous among the elongate, dark glands; the calyx densely villous on the outside, the villi overtopping and mostly hiding the glands. This extreme is confined to the Pacific Slope, mostly of California; but also on the Pacific slope we find other variations connecting gradually with series with glabrous leaves, pedicels glabrous or short-pilose and with very short glands, and calyx glandular or glandless and not villous. East of the range of var. *velutinus* there occurs var. *scopulorum*, with leaves quite glabrous beneath, the pedicels quite glandless or with minute and scattered sessile glands; and in the southern Rocky Mountains var. *scopulorum* gives way to a dwarf extreme, var. *parvifolius* (Gray) (PLATE 365, FIGS. 1–3) in which the leaves are mostly glabrous and the pedicels decidedly so. Contrasted with the reduction or loss of glands in some Rocky Mountain extremes (though a wide-ranging variety with short stipitate glands (PLATE 365, FIG. 4) also occurs there) we have the great development of long stipitate glands (PLATE 364, FIG. 6 and 365, FIG. 4) on much of

[1] For revision of *Rubus idaeus* and some of its varieties see Fernald, RHODORA, XXI. 89–98 (1919).

the material of the Pacific Slope and about the Upper Great Lakes. These varieties need not here be discussed but it becomes necessary to determine the exact significance of the two original specific names, *R. parviflorus* Nutt. Gen. i. 308 (1818) and *R. nutkanus* Moçino ex Seringe in DC. Prodr. ii. 588 (1825).

Singularly enough, true *Rubus parviflorus* (var. *genuinus*) is the rarest and most highly localized of the varieties. In view of the prevalence about the Upper Great Lakes of variations with glandular-hispid calices, it is surprising that Thomas Nuttall originally got hold of a very rare extreme, with the calyx densely white-villous, as in the Californian var. *velutinus*. Nuttall, who chose a most unhappy name for one of the largest-flowered species of the genus, gave this account.

* *parviflorus*. Shrubby and unarmed, leaves simple, palmately lobed; peduncles 2 or 3-flowered; flowers small; segments of the calix villous, ovate, abruptly acuminate; petals oblong-ovate, white. HAB. On the island of Michilimackinak, lake Huron.—Nutt. Gen. i. 308 (1818).

Just such a shrub, with the calyx densely white-villous (PLATE 364, FIGS. 3 and 4), is represented before me by a specimen collected on Mackinac Island in July, 1881 by T. E. Boyce. I have seen no other material like it from Mackinac Island; but it is in the herbarium of the Michigan State College from a single area (Gogebic Co.) on the Upper Peninsula of Michigan and in that of the University of Wisconsin from three counties in northern Wisconsin. The identity of *R. parviflorus* (var. *genuinus*) is, therefore, clear. Its nearest relative, it is noteworthy, is the Californian var. *velutinus*, rather than the other varieties which occur about the Upper Great Lakes.

The identity of *Rubus nutkanus* is not easily made out from the description. Seringe, taking the name from a manuscript of Moçino, graciously ascribed it to the Spanish botanist; but Seringe's description needs special interpretation. It was as follows:

92. R. NUTKANUS (Moç. pl. Nutk. icon.) caule fruticoso inerme glutinoso, ramis teretibus glabris rufis, foliis 5-lobis inaequaliter dentatis floribus subcorymbosis subquanternis, laciniis calycinis ovatis glabris longè acuminatis corallam aequantibus . . . in Americâ boreali. Aff. R. odorato sed pedunculi calycesque glabri. Fl. albi. Fruct. ign.

Nootka (or Nutka) Sound is on the west side of Vancouver Island. No form of *Rubus parviflorus* known in the region from Sitka to California has *glabrous* peduncles, all of them being copiously glandular. Consequently, in interpreting the description it is necessary to take into account the romantic and not-too-well-known history of the plates (*icones*) of Moçino and Sessé. Very briefly, these drawings

(not botanical specimens), brought by a Spanish student to Geneva and then peremptorily ordered returned to Madrid, were hastily copied by artistically inclined ladies for their friend, A. P. De Candolle; and the many descriptions from the drawings of Moçino and Sessé were actually made, not from the original specimens or even the original drawings, but from the hastily made copies. A tracing of the copy of *R. nutkanus* at Geneva is in the Gray Herbarium. Although not exactly identifiable as to variety, it is certainly *R. parviflorus*. I am accordingly recognizing the plant (PLATE 365, FIG. 4) of the Pacific slope with least obvious pubescence as standing for *R. nutkanus*. In 1929, Farwell, without designating any of the characters used in this paper, substituted for *R. nutkanus* the name *R. parviflorus*, var. *grandiflorus*.

As I view *Rubus parviflorus* it falls into the following geographic varieties. In citing specimens those not in the Gray Herbarium are indicated as follows: University of Michigan (Mich.); Michigan State College (Mich. State); University of Wisconsin (Wisc.); Arnold Arboretum (Arn. Arb.).

a. Glands of the pedicels all or nearly all stipitate. . . . *b.*

b. Calyx-lobes densely long-villous with pale trichomes hiding the glands; leaves mostly soft-pubescent to touch beneath; glands of pedicels long and unequal.

Petioles and young branches sparsely short-pilose to glabrous except for the stipitate glands; leaf-blades glabrous or glabrate above, green beneath . . . . . 1. Var. *genuinus*.

Petioles and young branches copiously long-pilose to villous among the glands; leaf-blades soft-pubescent to touch above, the young whitish-velutinous beneath . . . . . 2. Var. *velutinus*.

b. Calyx-lobes puberulent, minutely tomentulose or glandular-hispid, not long-villous. . . . *c.*

c. Glands of pedicels and peduncles very unequal, mostly dark-colored, the longest often 1–2 mm. long.

Lower surfaces of leaves with soft divergent pubescence (soft to touch) abundant . . . . . 3. Var. *hypomalacus*.

Lower surfaces glabrate to glabrous, not obviously soft-pubescent to touch . . . . . 4. Var. *heteradenius*.

c. Glands of pedicels and peduncles mostly subequal and short, often pale, rarely more than 0.5 mm. long, longer scattered glands when present rarely more than 1 mm. long.

Lower surfaces of leaves with soft divergent pubescence (soft to touch) abundant . . . . . 5. Var. *bifarius*.

Lower surfaces of leaves glabrous or soon glabrate. 6. Var. *grandiflorus*.

a. Glands of pedicels all or nearly all sessile or subsessile or even wanting; leaves glabrous or only minutely and sparsely pubescent beneath.

Shrubs mostly 1–2 m. high; leaves mostly 1–3 dm. broad, glabrous beneath; inflorescences 3–7-flowered, their lowest pedicels 1–3.5 cm. long. . . . . 7. Var. *scopulorum*.

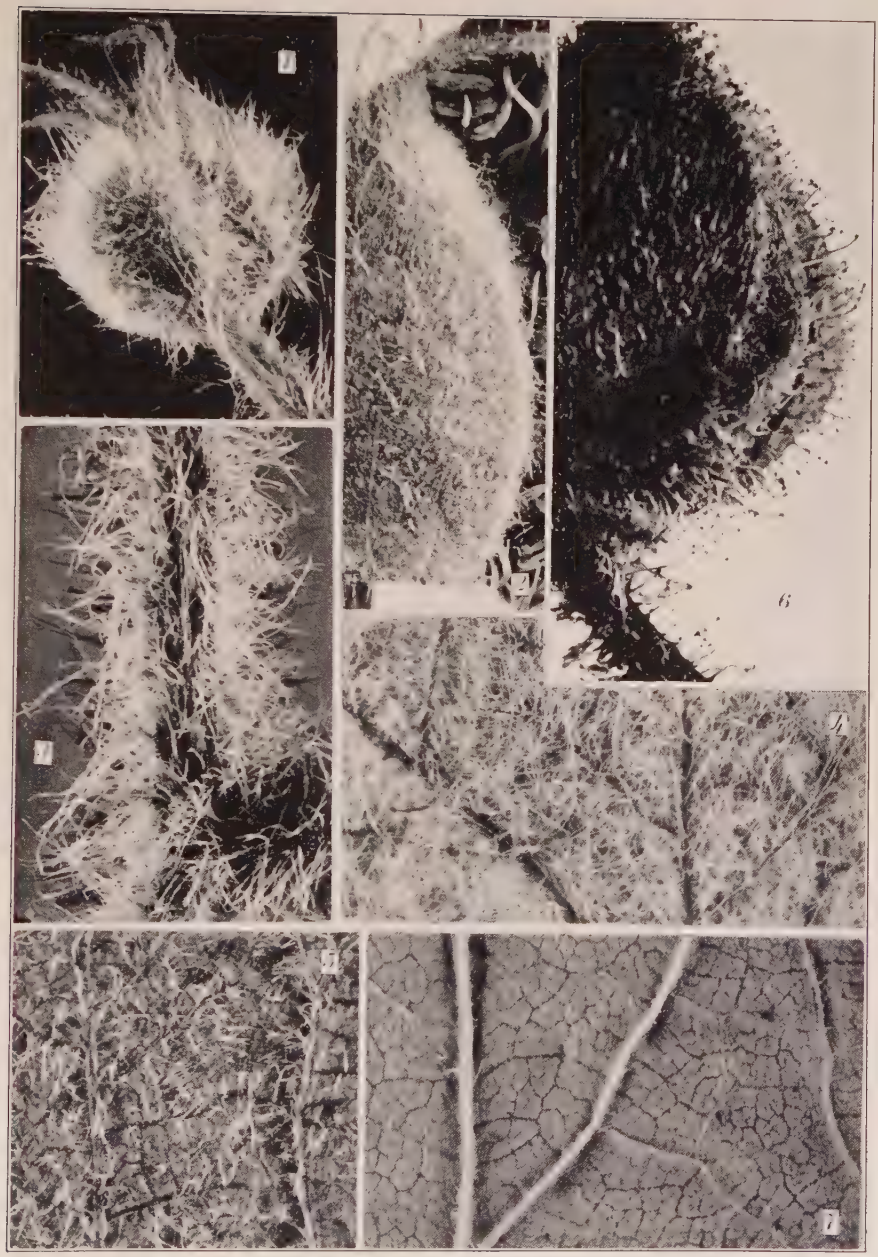


Photo. E. C. Ogden.

VARIETIES OF RUBUS PARVIFLORUS; all figs. × 10.

Var. GENUINUS: FIG. 1, young calyx; FIG. 2, portion of sepal; both from Michigan.
Var. VELUTINUS: FIG. 3, peduncle; FIG. 4, lower surface of leaf; both from California.
Var. HYPOMALACUS: FIG. 5, lower surface of leaf from Washington (TYPE).
Var. HETERADENIUS: FIG. 6, pedicel and calyx, from British Columbia; FIG. 7, lower surface of leaf, from Washington (TYPE).

Photo. E. C. Ogden.

VARIETIES OF RUBUS PARVIFLORUS; habit, × $\frac{2}{5}$ details, × 10.

Var. GRANDIFLORUS: FIG. 4, pedicel and calyx, from South Dakota.

Var. SCOPULORUM: FIG. 5, pedicel, from Colorado.

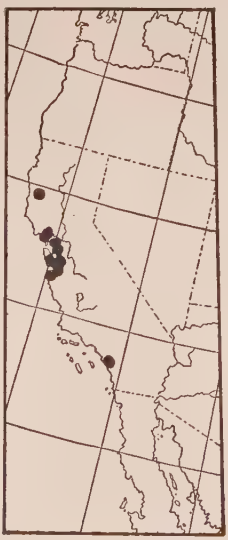
Var. PARVIFOLIUS: FIG. 1, 2 plants; FIG. 2, calyx and pedicel; FIG. 3, lower surface of leaf; all from New Mexico.

Shrubs 1.5–6 dm. high; leaves 0.5–1.3 dm. broad, minutely and sparsely pubescent to glabrate beneath; inflorescences 1–2 (–4)-flowered, their lowest pedicels 2–6 cm. long.
8. Var. *parvifolius*.

1. Rubus parviflorus Nutt., var. **genuinus** (Plate 364, figs. 1 and 2). *R. parviflorus* Nutt. Gen. i. 308 (1818). *R. nutkanus*, β, *Nuttallii* Torr. & Gr. Fl. N. Am. i. 450 (1840). *Rubacer parviflorum* (Nutt.) Rydb. Bull. Torr. Bot. Cl. xxx. 274 (1903), in small part, but as to type. *Bossckia parviflora* (Nutt.) Greene, Leaflets, i. 211 (1906), as to type. *R. nutkanus*, var. *parviflorus* (Nutt.) Focke, Bibl. Bot. xvii[72]. 124 (1911), as to type.—Localized about the Upper Great Lakes in northern Michigan, Wisconsin (and presumably Minnesota). The following have been studied. Michigan: Mackinac Island, July, 1881, *T. E. Boyce*, no. 783 (topotype); upper reaches of Slate River and surrounding woods, Gogebic Co., August 25, 1919, *H. T. Darlington*, no. 3041 (Mich. State). Wisconsin: Stony Creek, Algoma, Kewaunee Co., July 24, 1929, *J. J. Davis* (Wisc.); Sturgeon Bay, Door Co., July 26, 1929, *J. J. Davis* (Wisc.); Superior, Douglas Co., June 30, 1927, *L. R. Wilson & L. M. Jones*, no. 279 (Wisc.). Map 15.

Map 15. Range of Rubus parviflorus, var. genuinus.

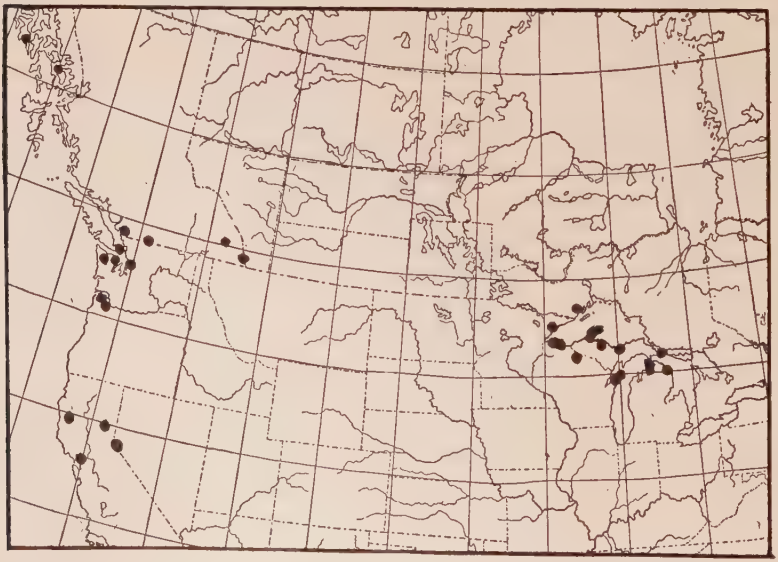
2. Var. velutinus (Hook. & Arn.) Greene, Bull. Torr. Bot. Cl. xvii. 14 (1890) (Plate 364, figs. 3 and 4). *R. velutinus* Hook. & Arn. Bot. Beech. Voy. 140 (1832), not Vest (1823). *R. nutkanus*, var. *velutinus* (Hook. & Arn.) Brewer, Bot. Calif. i. 172 (1876). *Rubacer tomentosum* Rydb. Bull. Torr. Bot. Cl. xxx. 274 (1903). *Rubacer velutinus* (Hook. & Arn.) Heller, Muhlenbergia, i. 106 (1904). *Rubus parviflorus*, var. *grandiflora* [*us*], subvar. *velutinus* (Hook. & Arn.) Farwell, Am. Midl. Nat. xi. 263 (1929).—Coastal region of California. Map 16.



Map 16. Range of Rubus parviflorus, var. velutinus.

3. Var. **hypomalacus**, var. nov. (tab. 364, fig. 5), foliis subtus subvelutinis; pedicellorum pedunculorumque glandulis stipitatis valde inaequalibus plerumque sordidis longioribus ad 1–2 mm. longis.—Southern Alaska to southern California, inland across southern British Columbia to the Canadian Rocky Mountains; about the Upper Great Lakes, northern Michigan, Wisconsin, Minnesota and adjacent Ontario. The following (selected from many specimens) are representative. Michigan: limestone till, Bois Blanc Island, Mackinac Co., *Ehlers*, no. 4852;

rich deciduous woods above Miner's Falls, near Munising, Alger Co., *Fernald & Pease*, no. 3388; along road to Mt. Mesnard, Marquette Co., August 3, 1906, *Dachnowski* (Mich.); edge of open woods, near Bear Lake, Houghton Co., *Hermann*, no. 389 (Mich.); "in peninsulâ Keweenaw, anno 1863," *J. W. Robbins;* Bête Grise, Keweenaw Co., *Hermann*, no. 337 (Mich.); north shore of Thunder Bay, Alpena Co., July 3, 1895, *C. F. Wheeler* (Mich. State); roadside between Cecil Bay and Big Stone Bay, Emmet Co., *C. O. Erlanson*, no. 303 (Mich.); coniferous woods near Cecil Bay, *Ehlers*, no. 2896 (Wisc.); mixed woods, Big Stone Bay, *Ehlers*, no. 503. Wisconsin: Whitefish Bay, west shore of Lake Michigan, June 22, 1866, *Lewis Foote* (Mich.); woods and fields, Ephraim, Door Co., *Pease*, no. 18,040; Clark Lake, Door Co., August 1, 1929, *J. J. Davis* (Wisc.); bank near Sand Lake, Lac du Flambeau Reservation, Vilas Co., *Fassett*, no. 10,827 (Wisc.); Sand Island, Lake Superior, *L. S. Cheney*, no. 6184 (Wisc.); Washburn, Bayfield Co., June 27, 1910, *E. H. Toole* (Wisc.); woods near Port Wing, Bayfield Co., June 14, 1928, *Griscom*. Minnesota: Two Harbors, Lake Co., June, 1893, *E. P. Sheldon*. Alaska: Stika, *Bongard;* clearing at beach, Tongas Village, *Walker*, no. 891. British Columbia: damp thickets, Kootenai Pass, *Dawson*, no. 139; shore of Howser Lake, Selkirk Mts., *Shaw*, no. 708; Chilliwack Valley, *J. M. Macoun*, no. 34,808; Vancouver, June 25, 1903, *J. Fowler* (Wisc.). Washington: Friday Harbor, San Juan Islands, *Zeller*, no. 757; Port Ludlow, June 15, 1889, *F. Binns;* foothills, Olympic Mts., *J. M. Grant*, no. 211 (type in Gray Herb.);



Map 17. Range of Rubus parviflorus, var. hypomalacus.

fields, Marysville, May, 1924, *J. M. Grant.* OREGON: Ross Slough, Coos Co., *H. H. Smith,* no. 3678; hillsides, Portland, August 30, 1889, *Drake & Dickson.* CALIFORNIA: near John Day's, Mendocino Co., *Heller,* no. 5850; north slopes, Jonesville, Butte Co., *Copeland,* no. 419 (Wisc.); Berkeley, *W. W. Jones,* no. 161. NEVADA: King's Cañon, Ormsby Co., *C. F. Baker,* no. 1097. MAP 17.

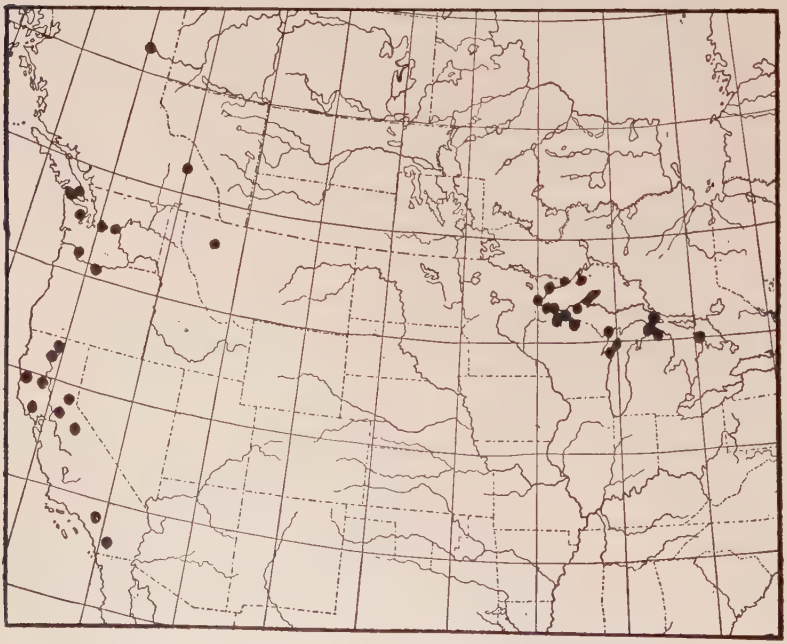
In some of its specimens var. *hypomalacus* approaches the Californian var. *velutinus* but it differs in the shorter and more glandular pubescence of the calyx, in the less villous branchlets and, usually, in the sparser pubescence of the foliage. Doubtless var. *hypomalacus* has been the basis of some records of var. *velutinus* from north of California.

MAP 18. Range of RUBUS PARVIFLORUS, var. HETERADENIUS.

4. Var. **heteradenius,** var. nov. (TAB. 364, FIG. 6), foliis subtus (nerviis exceptis) glabris vel glabratis; pedicellorum pedunculorumque glandulis valde inaequalibus plerumque sordidis longioribus ad 1–2 mm. longis.—Southern Alaska to Oregon and the Selkirk Mts. of British Columbia; region of Upper Great Lakes, Michigan, Wisconsin and Minnesota. The following are characteristic. MICHIGAN: rocky woods, Bois Blanc Island, Mackinac Co., *Ehlers,* no. 4852 (Mich.); Negaunee, Marquette Co., July, 1871, *Mary H. Clark* (Mich.); "in peninsulâ Keweenaw, anno 1863," *J. W. Robbins;* Bête Grise, Keweenaw Co., *Hermann,* no. 337 (Mich.); border of open woods north of Garden, Delta Co., *Fernald & Pease,* no. 3389. WISCONSIN: Door Co., July 1, 1883, *Schuette* (Wisc.); Madeline Island, Ashland Co., *Jackson & Sheldon,* no. 217 (Wisc.); Superior, August 23, 1893, *E. T. Harper* (Wisc.). MINNESOTA: woods and wooded hillsides, near

Hoveland, Cook Co., *Rosendahl & Butters*, no. 4627. Alaska: Sitka, *Bischoff*. British Columbia: Glacier, August 19, 1909, *Olson;* Vancouver, June 8, 1903, *J. Fowler* (Wisc.). Washington: fields, Marysville, May, 1922, *J. M. Grant* (Wisc.); grassy slopes, at 3000–4000 ft., Mt. Paddo, *Suksdorf*, no. 1758; on damp ground, Falcon Valley, June 26, 1893, *Suksdorf*, no. 1758 (type in Gray Herb.). Oregon: Willamette Hills, May, 1892, *Mulford;* along stream, Salem, *J. C. Nelson*, no. 1280. Map 18.

5. Var. **bifarius**, var. nov., foliis subtus subvelutinis; pedicellorum pedunculorumque glandulis stipitatis uniformibus plerumque pallidis vix 0.5 mm. longis.—British Columbia to southern California and northwestern Montana; region of Upper Great Lakes, Ontario, Michigan, Wisconsin and Minnesota. The following are characteristic. Ontario: Cameron Lake, Bruce Co., *Krotkov*, no. 7549. Michigan: open rocky woods, Prentis Bay, Mackinac Co., *Ehlers*, no. 1343 (Mich.); Eureka, Houghton Co., *Hermann*, no. 389 (Mich.); roadside near Silver Isle, Keweenaw Co., *Hermann*, no. 2187 (Mich.); edge of spruce woods near Bête Grise, Keweenaw Co., *Hermann*, no. 337 (Mich.); Isle Royale, 1868, *A. E. Foote* (Mich.); Ontonagan, 1860, *Mary H. Clark* (Mich.); gravel ridges Koss, Menominee Co., July 12, 1905, *C. A. Davis* (Mich.); banks of Limestone Creek, south of Mackinaw City, Cheboygan Co., *Ehlers*, no. 5261; shaded rich ground, near



Map 19. Range of Rubus parviflorus, var. bifarius.

Photo. E. C. Ogden

CHAMAERHODOS NUTTALLII: FIG. 3, branch, × 10, to show pubescence.
C. NUTTALLII, var. KEWEENAWENSIS: FIG. 1, plant, × 1, from Keweenaw Peninsula; FIG. 2, branch, × 10, to show pubescence.

Photo. E. C. Ogden.

POTENTILLA FRUTICOSA, forma VILLOSISSIMA: FIG. 1, fruiting branch, × 1; FIG. 2, leafy branch, × 1; FIG. 3, branchlet, × 3.

Grand Lake, Presque Isle Co., June 26, 1912, *C. K. Dodge* (Mich.). WISCONSIN: Washington Island, Door Co., July 3, 1931, *J. J. Davis* (Wisc.); rocky banks of Potato River, Gurney, Iron Co., *Newton Bobb*, no. 272 (Wisc.); Ashland, *Hermann*, no. 294 (Mich.); La Pointe, September, 1858, *Lapham* (Wisc.); mainland east of Sand Bay, Lake Superior, *L. S. Cheney*, no. 6275 (Wisc.); Wisconsin River, Newbold, *Cheney*, no. 1624 (Wisc.). MINNESOTA: opening in hardwoods, Grand Portage, Cook Co., *Butters & Buell*, no. 344; Two Harbors, Lake Co., *Sheldon*, nos. 4938, 5254 (Wisc.); Farquhar Point, Lake Superior, 1870, *J. C. Jones* (Mich.); near Duluth, July 5, 1893, *A. E. Gurd* (Mich.). MONTANA: woods, foot of Kootenai Mts., Big Fork, August 10, 1901, *Umbach*. BRITISH COLUMBIA: rich woods along Wicked River, near the Peace River, *Raup & Abbe*, no. 3800 (Arn. Arb.); banks near Cameron Lake, Vancouver Island, July 14, 1917, *W. R. Carter* (TYPE in Gray Herb.); thickets, District of Renfrew, *Rosendahl & Brand*, no. 3. WASHINGTON: Brinnon, Jefferson Co., *Beattie*, no. 3068 (Wisc.); Snoqualmie, August 8, 1924, *E. J. Kraus* (Wisc.); Kelso, August 8, 1924, *Kraus* (Wisc.); Peshastin, Okanagan Co., *Sandberg & Leiberg*, no. 542. OREGON: open woods, lower Hood River, 1924, *Henderson*, no. 892. CALIFORNIA: near John Day's, Mendocino Co., *Heller*, no. 5850; Goose Valley, Shasta Co., *Eastwood*, no. 883; between Upper Soda Spring and Shasta Retreat, Siskiyou Co., *Heller*, no. 7949; Yosemite Valley, alt. 4000–4500 feet, *Abrams*, no. 4367; wooded north slope, west of Bennett, Glenn Co., *Heller*, no. 11,979; ravine near Fallen Leaf Lake, Tahoe, *Smiley*, no. 361; Big Trees, Calaveras Co., *H. Mann;* vicinity of San Bernardino, alt. 6500 feet, *W. G. Wright*, no. 250; in shade near brook, Idyllwild, San Jacinto Mts., alt. 5300 feet, *M. F. Spencer*, no. 1731. MAP 19.

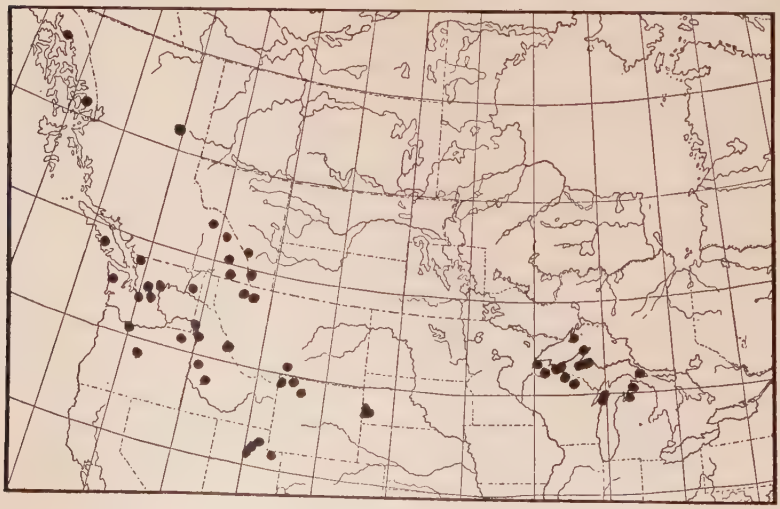
Var. BIFARIUS, forma **lacera** (Kuntze), comb. nov. *R. nutkanus*, f. *lacera* Kuntze, Meth. Sp. 102 (1879).—Vancouver Island, 1858, *Lyall*.

A sheet of the type-collection (in flower) in the Gray Herbarium is clearly a cut-leaved form of var. *bifarius*. Its leaves are cleft only 2/3–3/4 to the base. R. PARVIFLORUS, forma PEDATIFIDUS Hermann, RHODORA, xxxvii. 61, t. 326, fig. 2, has the leaves cleft to the base. It also is a form of var. *bifarius*.

Another form of *R. parviflorus*, presumably belonging to var. *bifarius*, is f. **Fraserianus** (J. K. Henry), comb. nov. *R. parviflorus*, var. *Fraserianus* J. K. Henry, Torreya, xviii. 54, fig. 1 (1918), a plant with leaves "rather densely pilose beneath" and differing from the ordinary forms in having the summits of the petals laciniate-dentate. It is described as "not common" at Ucleulet, Vancouver Island. It must be considered an aberrant form, not a true geographic variety.

6. Var. GRANDIFLORUS (as "GRANDIFLORA") Farwell, Am. Midl. Nat. xi. 263 (1929). (PLATE 365, FIG. 4.) *R. nutkanus* Moçino ex

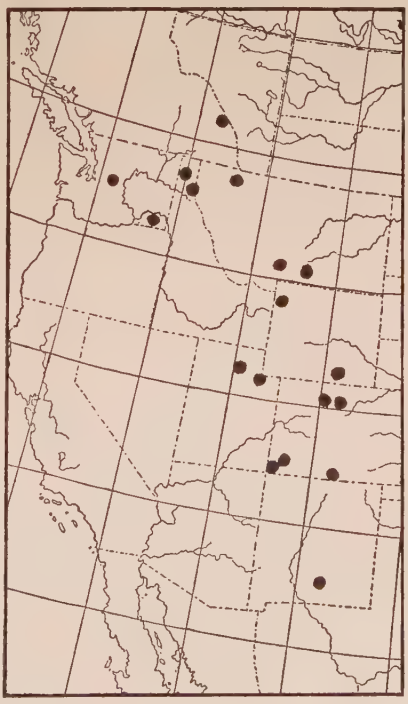
Seringe in DC. Prodr. ii. 566 (1825), inadequately characterized.—Southern Alaska to Oregon, Idaho, Utah and Wyoming; Black Hills, South Dakota; region of Upper Great Lakes, Michigan and Wisconsin (doubtless also Minnesota). The following are characteristic. MICHIGAN: open woods, Prentis Bay, Mackinac Co., *Ehlers*, no. 1349 (Mich.); Marquette, *Pepoon*, no. 1563 (Mich.); shaded ground, Suger Loaf Mt., Marquette Co., July 3, 1916, *C. K. Dodge* (Mich.); L'Anse, Baraga Co., August 29, 1893, *S. R. Bailey* (Mich.); Elk Rapids, June 30, 1902, *Cooper* (Mich. State); Keweenaw Peninsula, 1863, *Robbins;* Isle Royale, *Stuntz & Allen*, no. 102; open woods, Rock Harbor, Isle Royale, *McFarlin*, no. 2004. WISCONSIN: sandy woods, Washington Island, Door Co., *A. M. Fuller*, no. 1395 (Wisc.); Door Co., July, 1883, *Schuette;* lower 2 miles of Montreal River, *L. S. Cheney*, no. 5090 (Wisc.); Vilas Co., July 1, 1923, *S. I. Lilygren* (Wisc.); Mt. Whittlesey, Mellen, Ashland Co., *L. R. Wilson*, no. 10,135 (Wisc.); Grandfather Bull Falls, Lincoln Co., *Cheney*, no. 2471 (Wisc.); Drummond, *Cheney*, no. 4144 (Wisc.); Superior, Douglas Co., *Chas. Goessl*, no. 7843 (Wisc.) SOUTH DAKOTA: near Lead City, alt. 5500–6500 feet, *Rydberg*, no. 655; head of City Creek, alt. 5300 feet, *J. Murdoch*, jr., no. 3541; damp ravines, Pluma, *W. P. Carr*, no. 175. MONTANA: Decent to Ross' Hole, *S. Watson*, no. 103; woods, Midvale, *Umbach*, no. 412 (Wisc.); Lake McDonald, *Vreeland*, no. 933; Emigrant Gulch, *Rydberg & Bessey*, no. 4327. IDAHO: copses above Lewiston, *Sandberg, MacDougal & Heller*, no. 300; Lake Waha, Nez Perces Co., June 22, 1896, *Heller* (Wisc.); timbered hillside, Tamarack, Washington Co., *J. A. Clark*, no. 225; creek-bank, Boise, *J. A. Clark*, no. 98. WYOMING: Crandall Creek, Clark's Fork Mts., August, 1881,



MAP 20. Range of RUBUS PARVIFLORUS, var. GRANDIFLORUS.

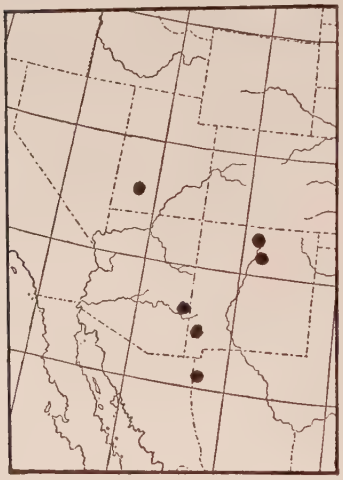
Forwood; wooded cañon, Yancey's, *Nelson & Nelson*, no. 5924. COLORADO: rocky slopes, Rabbit Ear Range, Routt Co., *Goodding*, no. 1596. UTAH: timbered gulch, Dyer Mine, Uintah Mts., *Goodding*, no. 1424; Red Butte Cañon, July 11, 1908, *Mrs. Joseph Clemens;* Wasatch Mts., at 7000 feet, *S. Watson*, no. 308; shady subalpine banks, alt. 8000–10,000 feet, Peterson Cañon, *Pammel & Blackwood*, no. 3803. ALASKA: Wrangell, *Walker*, no. 677; Juneau, June 25, 1899, *L. J. Cole* (Wisc.). BRITISH COLUMBIA: poplar-spruce forest, near head of Rocky Mountain Cañon, Peace River, *Raup & Abbe*, no. 3742 (Arn. Arb.); woods, Emerald Lake, Selkirk Mts., *Shaw*, no. 129; Carbonate, Selkirk Mts., *Shaw*, no. 188; thickets, Donald, July 3, 1885, *J. M. Macoun.* WASHINGTON: Clark Springs, Spokane Co., *Krueger*, no. 37; mountains above Chelan, *Lake & Hull*, no. 502 (Wisc.) upper valley of the Nesqually, *O. D. Allen*, no. 25; valley of Swauk River, Kittitas Co., *S. P. Sharples*, no. 121; lake-shore, Quiniault, *Conard*, no. 103; Snoqualmie, August 12, 1924, *E. J. Kraus* (Wisc.); Bagley Lake, Whatcom Co., *J. W. Thompson*, no. 5358. OREGON: Mt. Emily, La Grande, Union Co., *H. P. Hansen*, no. 1078 (Wisc.); Crook Co., July 17, 1922, *Whited;* Bridal Veil, Multnomah Co., *H. H. Smith*, no. 3085. MAP 20.

7. Var. **scopulorum** (Greene), comb. nov. (PLATE 365, FIG. 5). *R. nutkanus*, var. *scopulorum* Greene ex Focke, Bibl. Bot. xvii[72]. 124 (1911).—Southeastern British Columbia and central Washington to New Mexico. The following are characteristic. BRITISH COLUMBIA: Kicking Horse Valley, *S. Brown*, no. 481. WASHINGTON: Blue Mts., Columbia Co., *Horner*, no. B164; Snoqualmie, August 12, 1924, *E. J. Kraus* (Wisc.). IDAHO: valley of North Fork of Coeur d'Alene River, *Leiberg*, no. 1525; woods, Sand Point, *Umbach*, no. 424 (Wisc.). MONTANA: coniferous woods, Lake Josephine Trail, Glacier Nat. Park, *McLaughlin*, no. 718 (Wisc.); West Rosebud River, alt. 7000 feet, July 11, 1923, *P. H. Hawkins* (Wisc.); Spanish Creek, Gallatin Co., July 15, 1901, *Vogel.* WYOMING: Jennings Lake, Jackson Hole, *Merrill & Wilcox*, no. 916; Centennial Valley, *Nelson*, no. 1676.



MAP 21. Range of RUBUS PARVIFLORUS, var. SCOPULORUM.

Utah: Big Cottonwood Cañon, Salt Lake Co., *O. A. Garrett*, no. 1685; wooded slope near Stillwater Fork, Uintah Mts., *Payson & Payson*, no. 5147. Colorado: forest, gulch west of Bear River, alt. 7000 feet, *Crandall*, no. 195; headwaters of Clear Creek, *Parry*, no. 211; mountains about Steamboat Springs, Routt Co., July 15, 1902, *G. E. Osterhout* (Wisc.); bottom of La Plata Cañon, *Baker, Earle & Tracy*, no. 680. New Mexico: Sierra Blanca Peak, Otero Co., *C. B. Wolf*, no. 2858. Map 21.



Map 22. Range of Rubus parviflorus, var. parvifolius.

8. Var. **parvifolius** (Gray), comb. nov. (Plate 365, figs. 1–3). *R. nutkanus*, var. *parvifolius* Gray, Pl. Fendl., Mem. Amer. Acad. ser. 2, iv. 42 (1849).—Utah and New Mexico to northern Chihuahua. Utah: City Creek Canon, June 4, 1883, *F. E. Leonard*. New Mexico: shady banks of Santa Fé Creek, June, July, 1847, *Fendler*, no. 208 (type); Winsor's Ranch, alt. 8400 feet, Pecos River National Forest, *Standley*, no. 4032; 10 miles east of Mogollon, at 8700 feet, Mogollon Mts., Catron Co., *C. B. Wolf*, no. 2711; Mogollon Creek, at 7500 feet, Socorro Co., *Metcalf*, no. 281. Arizona: in timber, Thompson Ranch, Black River, *Goodding*, no. 576. Mexico: mountains 15–20 miles south of Pacheco, Chihuahua, *C. V. Hartman*, no. 696. Map 22.

Chamaerhodos Nuttallii Pickering, var. **keweenawensis**, var. nov. (tab. 366, figs. 1 et 2), caulibus ramisque valde hispidis, pilis ad 1.5 mm. longis.—Keweenaw County, Michigan: wind-swept crests, crevices and talus of sandstone-conglomerate, West Bluff, July 4, 1934, *Fernald & Pease*, no. 3376 (type in Gray Herb.). See p. 213 and map 10.

Chamaerhodos Nuttallii Pickering in Torr. & Gray, Fl. N. Am. i. 433 (1840), as synonym of *C. erecta* β. *Nuttallii* T. & G., l. c. (1840), Rydberg, N. Am. Fl. xxii. 377 (1908), validating the name, was based on *Sibbaldia erecta* β. *parviflora* Nutt. Gen. N. Am. Pl. i. 207 (1818), from "the highest gravelly hills, 10 to 15 miles from the Mandan villages." *C. Nuttallii*, found on arid plains and crests from Yukon to Colorado, east to Manitoba and western Minnesota, has the stem and branches densely glandular and at most minutely pilose. Its pubescence is well displayed in fig. 3, made from plants collected in the type region, dry hilltop, Mandan, North Dakota, June 23, 1912

TYPE OF GEUM VIRGINIANUM

(Specimen in Linnean Herbarium; photograph from Mr. *S. Savage*).

GEUM ALEPPICUM
(after *Jacquin*).

by *O. A. Stevens*. The plant of the Keweenaw region, isolated by 375 miles from typical *C. Nuttallii*, is consistently hispid (as well as glandular) as shown in FIG. 2.

WALDSTEINIA FRAGARIOIDES (Michx.) Tratt., var. **parviflora** (Small), comb. nov. *W. parviflora*, Small, Bull. Torr. Bot. Cl. xxv. 137 (1898).

Waldsteinia fragarioides, like *Fragaria virginiana*, has petals highly variable in size as well as outline. When Small published *W. parviflora* as a new southern species he stated that "The new species may be distinguished from *W. fragarioides* by the more prominent disc, the small sessile petals which are about as long as the calyx-segments or shorter, and the larger obovoid achene." Later Rydberg, in N. Am. Fl. xxii[5]. 398 (1913), reduced *W. parviflora* to *W. Doniana* Tratt., the latter based on the description and plate of a plant introduced into English gardens by George Don and illustrated as *Dalibarda fragarioides* in Bot. Mag. xxxviii. t. 1567 (1813); and in his Manual Small accepts this reduction, stating his conception of the differences between *W. fragarioides* and *W. Doniana* as follows:

Petals twice as long as the sepals or longer; sepals mostly longer than the hypanthium . . . . . 1. *W. fragarioides.*
Petals as long as the sepals or shorter; sepals mostly shorter than the hypanthium . . . . . 2. *W. Doniana.*

There is no evident or stated difference in the foliage and both plants show the same range of pubescence. If the distinction in the calyx given in Small's key is compared with the original plate of *W. Doniana* an unfortunate contradiction will be noted: the original plate of *W. Doniana* shows the hypanthia 3–4 mm. long, the lanceolate sepals 6.5–10 mm. long. In fact, *W. Doniana* is one of the extremes of *W. fragarioides* with longest rather than shortest sepals. In having the petals shorter than the exaggeratedly long sepals it differs from the more general run of *W. fragarioides* in the North, but its petals, correctly described "oblong-ovate," are shown in the plate up to 7 mm. long and 3.5 mm. broad, a measurement near the average for the northern plant. *W. parviflora*, under the misleading alias, *W. Doniana*, is defined as having "sepals triangular-lanceolate, . . . 2.5–3 mm. long" (*Rydberg*), "petals 2–4 mm. long" (*Small*).

I am, therefore, unable to see that *Waldsteinia Doniana* is quite identical with *W. parviflora*. It seems to me a garden-development in which, presumably through unwonted nutrition, the sepals became exaggeratedly large, the petals remaining fairly typical for *W. fragari-*

oides. In the northern half of the range of *W. fragarioides* (New England to Ontario and Wisconsin) I get the following measurements

Locality	Length of Hypanthium	Length of Sepal	Length of Petal	Breadth of Petal
1. Monmouth, Maine	3 mm.	5 mm.	8 mm.	3.2 mm.
2. Benton, Maine	2.5	3.5	6	4
3. Hanover, New Hampshire	2	4.5	6	3.7
4. Lebanon, New Hampshire	2	4.5	7	3.5
5. St. Johnsbury, Vermont	2	2.5	5	2.5
6. Brandon, Vermont	2.5	5.5	9.5	5
7. Charlotte, Vermont	3	5.5	6	4.5
8. Middlebury, Vermont	2	4.5	7	4.5
9. Fair Haven, Vermont	3.5	5	6	3
10. Sudbury, Vermont	2	2.3–3	3.5	3
11. Poultney, Vermont	2	2.7	4.5	3
12. Brandon, Vermont	3.5	5.5	10	5
13. Coleraine, Massachusetts	3	3.5	8.5	6
14. Greenfield, Massachusetts	2.3	4	7	3.2
15. Greenfield, Massachusetts	4	6.5	10	5
16. Pittsfield, Massachusetts	2	4	7.5	4
17. Elmira, New York	2.5	5	5.5	3
18. Canadice, New York	2.5	5.5	8	3
19. Bainbridge, New York	3	4	6	5
20. Vaughns, New York	3	7.5	10	5.5
21. Newcomb, New York	2	3.8	4	2.8
22. Wingham, Ontario	3	2.7	6	2
23. Brittania, Ontario	2.5	4	6	3
24. Kingston, Ontario	3	5	6	3.5
25. Depere, Wisconsin	2.5	3.5	5	3.3
26. Lake Owen, Wisconsin	2	4	5.5	3

In the southern half of the range, down the Alleghanies, the measurements are similarly variable; but in the mountains from Virginia to Tennessee and Georgia there occurs an extreme plant with tiny petals, *Walsteinia parviflora* Small. There are only three sheets of it in the Gray Herbarium, but the measurements, while in most points overlapping those of the more northern *W. fragarioides*, indicate a fairly marked geographic variety, with very narrow and short petals:

Locality	Length of Hypanthium	Length of Sepal	Length of Petal	Breadth of Petal
Mts. North Carolina	2.5–3.5	3–4	3.5–4	1.5
Harriman, Tennessee	2–2.5	3–3.5	3.5	1.5
Northern Georgia	2.5	3–4.5	2.5	1

Potentilla pensylvanica L. Ontario: sandy plain, Espanola, Sudbury Distr., no. 3378; sandy ground, site of Hudson Bay Co. post, Agawa Bay, Algoma Distr., *Pease*, no. 17,965. Michigan: Isle Royale, July 21, 1909, *Cooper;* wind-swept crests, crevices and talus of sandstone-conglomerate, West Bluff, no. 3379.

This is the plant treated by Rydberg as *Potentilla pensylvanica* L. Rydberg, in 1898, gave the range: "a comparatively rare plant,

ranging in British America from Hudson Bay to the Rockies, and in these extends southward to Colorado";[1] in 1908 he gave a similar range for his *P. pensylvanica:* "On the plains from Hudson Bay to the Yukon Territory and Colorado."[2] This species has the radical leaves definitely "pinnate with 7–15 leaflets, . . . leaflets gradually reduced downward, . . . divided . . . into oblong divisions" (*Rydberg*) and its easternmost known stations are on the west side of Hudson Bay and near the shores of Lakes Superior and Huron.

There has been much uncertainty regarding the exact typification of *Potentilla pensylvanica.* The Linnean account was as follows:

pensyluanica 28. POTENTILLA foliis inferioribus pinnatis, superioribus ternatis: foliolis inciso-serratis, caule erecto pubescente.
Pentaphylloides canadense, foliis agrimoniae. *Boerh. lugdb. I. p. 40.*
Habitat in Canada. ♃.
Folia Radicalia *pinnata: foliolis oblongis, obtusiusculis, serrato-dentatis, lineatis, mollibus, villosis: extimis tribus coadunatis maioribus; int[f]erioribus minoribus alternis.* Caulina *subdigitata, septena, ut P. recta, sed pinnatifida.* Petala *vix calyce maiora.* Habitus *P. rectae.* H. U. [Hortus Upsaliensis].[3]

From the habitat "Canada" and from the citation of Boerhaave's plant, which he had received through Sarrasin, who was physician of the Court of Quebec, it is natural to infer that the name *P. pensylvanica* belongs to the plant of coastal rocks and gravels which abounds on the lower St. Lawrence, thence northeastward through the Straits of Belle Isle and southward to the coast of New Hampshire. In 1896, Rydberg described the latter as *P. litoralis* Bull. Torr. Bot. Cl. xxiii. 264 (1896), characterized by "Leaves pinnate, of two approximate pairs of leaflets, the lower the smaller, or subdigitately 5-foliolate." Slightly thereafter, in his *Monograph* (1898) Rydberg maintained the plant of the eastern coast as *P. litoralis,* the plant of the Great Plains as *P. pensylvanica;* but he threw doubt into the situation by saying in his discussion of the western "*P. pensylvanica*": "There is some doubt as to whether this is the true *P. Pennsylvanica* L. The description of the leaves of that species seems to indicate rather *P. litoralis*" (p. 96). Under the treatment of the latter he correctly summarized the difference in the range of the two: "*P. litoralis* is principally a beach plant, or at least growing near the coast, while *P. Pennsylvanica*

[1] Rydb. Mon. N. A. Potent., Mem. Dept. Bot. Columb. Univ. ii. 97 (1898).
[2] Rydb. N. Am. Fl. xxii. 350 (1908).
[3] L. Mant. 76 (1767).

is an inland, plain or mountain species." *P. litoralis* was well illustrated in Rydb. Mem. Dept. Bot. Columbia Univ. ii. t. 37, figs. 1–5.

Subsequently (1908), without repeating the doubt he had expressed in 1898, Rydberg maintained the inland species with elongate, pinnate leaves of 7–11 leaflets as *P. pensylvanica*, the eastern coastal plant as *P. pectinata* Raf. Aut. Bot. 164 (1840). Rafinesque's account was unusually good:

1204, *Pot. pectinata* Raf. Pensylv. L. Tor[rey]. rare sp. of Canada and Boreal America, not of Pennsylvania: leaves hardly pinnatiform, rather digitate, 3–7folioles cuneate narrow pectinate, stipules lanceol. 2–3parted, stem bifurcate, calix linear lanceol. hirsute.

Potentilla pectinata Raf. (1840) and *P. litoralis* Rydb. (1896) are, then, synonyms, both belonging to the eastern coastal species. In view, however, of the facts, that Canada of Linnean time was primarily Quebec, that the Sarrasin specimen, which Boerhaave had, presumably came from the shores of the lower St. Lawrence, and that Rydberg had, himself, doubted in 1898 whether the eastern, rather than the western plant should stand as *P. pensylvanica*, it has seemed wise to settle the question. Through the always accommodating Assistant Secretary of the Linnean Society of London, Mr. S. Savage, I have a photograph of the Linnean type. Mr. Savage's letter accompanying it states that

I now send you a photograph of the type specimen of *Potentilla pensylvanica* Herb. Linn. The inscriptions on this sheet are as follows:
Ard [= Arduino], in Linnaeus's hand.
pensylvanica, in Linnaeus's hand.
Label in bottom right hand corner,—*13* in Arduino's hand, and *pensylvanica* in Linnaeus's hand.

The specimen which Linnaeus had before him and described in detail, even to the 7 lobes of the upper leaflets of the cauline leaves, is clearly the type; it is the specimen of which Torrey wrote in 1824: "*Sir J. E. Smith* informs me, that *P. pennsylvanica* of the Linnean Herbarium resembles *P. recta* in shape of leaflets and serratures, but is pinnate and very soft-downy."[1]

That it is a phase of the inland plant there can be no question; and that the name *pensylvanica* is quite as inappropriate for it as it would be for the Canadian and New England *P. pectinata* is equally obvious. In explanation of the misleading specific name published by Linnaeus a second letter from Mr. Savage is illuminating. Following up the source of *P. pensylvanica*, he finds that Linnaeus received it from

[1] Torr. Fl. N. Mid. U. S. 499 (1824).

Arduino some time subsequent to the publication of Species Plantarum ed. 2 (1762-63), and that the manuscript list of the specimens received at that time has in Linnaeus's hand the entry:

13. PENTAPHYLLOID. CANADENSE. *Potentilla canadensis* non habeo in speciebus accepi nuper ab aliis pulcherrimum specimen.

Since Linnaeus had already published the quite different *Potentilla canadensis* Sp. Pl. i. 498 (1753), it is evident that he adopted for the plant received from Arduino and published as *P. pensylvanica* (1767) a substitute-name which he thought to be equally appropriate.

With the type of *Potentilla pensylvanica* now settled, it becomes necessary to decide to what American species it belongs. I am unable, in the first place, to maintain as distinct species the plants kept up in the North American Flora as *P. pensylvanica* and *P. strigosa*. Others of the segregates seem to me conspecific but these, being later published, need not now concern us. The range of *P. pensylvanica*, as stated by Rydberg, has already been given. That of *P. strigosa* is amazingly similar, except for the inclusion of Asia: "Plains from Hudson Bay to Kansas, New Mexcio, and British Columbia; also northern Asia, according to Lehmann."

Rydberg's *Potentilla pensylvanica* is keyed by him (N. Am. Fl.) under "Petioles and stem appressed-pubescent" and the fuller diagnosis says "stem . . . more or less appressed-pubescent and tomentulose" while in the parallel definitions (key and diagnosis) *P. strigosa* is under "Petioles and stem with spreading hairs" and "stems . . . with long spreading hairs." Pubescence of "long spreading hairs" is not what one would expect of a plant called *strigosa*, for *striga* was originally a swath of mowed hay or grain (lying flat) and in modern scientific terminology *strigae* are defined as "sharp close-pressed rigid hairs" (*Lindley*, Treas. Bot.), and the adjective strigose (*strigosus*) as "covered with strigae" (*Lindley*), "beset with *appressed* sharp straight and stiff hairs" (*Gray*) or "beset with sharp-pointed *appressed* straight and stiff hairs or bristles" (*Jackson*) [Italics mine].

In 1898, when he treated *Potentilla strigosa* as a variety of *P. pensylvanica*, Rydberg regarded "typical *P. Pennsylvanica* . . . a comparatively rare plant," while *P. pensylvanica*, var. *strigosa* was "the most common form of *P. Pennsylvanica*, found in the same range as the species." That the two are separated only by illusory differences is clearly indicated by some of the plates specially selected by Rydberg as illustrating them. The first synonym under Rydberg's *P. pensylvanica* (N. Am. Fl. p. 350) is *P. missourica* Hornem. in Lindl.

Bot. Reg. xvii. t. 1412 (1831). The plate is one of Hart's characteristic drawings and it is significant that the horizontally spreading or even slightly reflexed stiff hairs are shown uniformly on the stem, petiole and rachis. As an illustration of Rydberg's *P. pensylvanica* with "Petioles and stem appressed-pubescent" it is very contradictory; as an illustration of his *P. strigosa* with "Petioles and stem with spreading hairs" it would be thoroughly characteristic. The hairs shown on the plate of the type of *P. missourica* are positively divergent; those shown in the plate (Mem. Dept. Bot. Columbia Univ. ii. t. 38, fig. 2) selected to illustrate the plant "with spreading hairs" are not strongly spreading. The futility of trying to maintain two species, "found in the same range" and with no stronger difference than that emphasized in the North American Flora is apparent.

Returning to the question of what *Potentilla strigosa* really is, it becomes necessary to review the somewhat inconclusive history of the name. Pallas, the great explorer and early writer on the flora of Siberia, left an Asiatic specimen marked *Potentilla strigosa*. Pursh, taking up *P. pensylvanica* for the plant of "Canada and New England" (i. e. *P. pectinata*), found the specimen of the undefined *P. strigosa* Pallas in Lambert's herbarium, and taking it to be a variety of the plant of the eastern American coast, called it *P. pensylvanica*,

strigosa. β. P. cano-pubescens; foliis pectinato-dentatis margine revolutis, floribus corymbosis.
P. strigosa. *Pallas in Herb. Lambert.*
Icon. *Gmel. sib. 3. t. 34. f.* 1.
.....β. on the Missouri.....
.....β. *v. s. in Herb. Lewis*.....
.....The variety β. appears to be a distinct species.[1]

The plant of the Missouri, collected by Capt. Lewis and described by Pursh "cano-pubescens" (not necessarily "with long spreading hairs") was supposed by Pursh to be the undescribed *P. strigosa* Pallas of Asia and the varietal name *P. pensylvanica*, β. *strigosa* Pursh consequently rests, at least in intent, partly upon the Siberian plant, which will now be checked. Pursh also cited a plate of a Siberian plant, one of Gmelin's very crude drawings which is not clearly referable by citation to any species discussed in Gmelin's text nor to anything North American. Regarding Gmelin's plate Trattinnick specially commented: "Quoad iconem Gmelini et notas a Purshio tributas non potest esse eadem cum P. pensylvanica."[2] That element

[1] Pursh, Fl. Am. Sept. 356 (1814).
[2] Tratt. Rosac. Mon. iv. 31 (1824).

of Pursh's concept may be dismissed as having nothing to do with the plant of the Missouri which Pursh specially described.

The Pallas plant, *P. strigosa*, was formally recognized as a species (and thus validated) by Trattinnick in 1824. Trattinnick's treatment follows:

POTENTILLA *strigòsa. Pallas.*

P. cano-pubescens; foliis pectinato-dentatis, margine revolutis, floribus corymbosis. Pursh.
Potentilla strigosa. Pall. in herb. Lambert.
Potentilla pensylvanica β. strigosa. Pursh. fl. Amer. sept. ed. 2. I. 356. Lehm. Potent. p. 55. Poir. Encycl. Suppl. IV. 543.
Potentilla foliis duplicato-pinnatis, venatis, valde exstantibus, subtus albicantibus, caule corymboso. Gmel. fl. sibir. III. p. 181. t. 34. f. 1.
Hab. in Sibiria, nec non ad Missurim fluvium in provincia Luisiana Amer. sept.

This account by Trattinnick, followed by the statement above quoted, that Gmelin's plate 34, fig. 1 does not belong to *Potentilla pensylvanica*, validly launched *P. strigosa* as a specific name. It is evident, however, that it was still as confused in the mind of Trattinnick as it had been with Pursh, but that Trattinnick made *P. strigosa* primarily Siberian. Many sheets of Asiatic plants distributed as *P. pensylvanica* or as *P. strigosa* are in the Gray Herbarium. About one half of those called *P. pensylvanica* are *P. chinensis* Seringe, the other half *P. niponica* Wolf; while the five sheets from the Altai sent out by Bunge and by Fischer as *P. strigosa* are quite unlike anything on our western plains.

If *Potentilla strigosa* Pallas is to be interpreted as the Siberian plant which Pallas had, then the name cannot be used for a wholly different North American species. If *P. strigosa* Pallas, first validly published as a species by Trattinnick in 1824, rests upon *P. pensylvanica* β. *strigosa* Pursh, of North America, it must not be overlooked that Pursh intentionally took the name from Pallas. At best the concept was from the start a confused one; to maintain the name *P. strigosa* Pallas for a strictly North American species would completely misinterpret Pallas's intention.

Chronologically, the next-published specific name for the characteristic plant of the Great Plains, which has been erroneously passing as ~~*P. pensylvanica*~~ and *P. strigosa* is *P. missourica* Hornem. in Lindl. Bot. Reg. xvii. t. 1412 (1831). This, although based on a very luxuriant garden specimen, is without question our plant. The name given by Horneman, without explanation, suggests that he was using it, correctly, because his species was that brought back by Capt.

Lewis from the Missouri and described by Pursh as *P. pensylvanica*, β. *strigosa*. The name *P. missourica* is unequivocal; and by those who see a specific line separating it from *P. pensylvanica* it should be used for the plant which Rydberg maintained as *P. strigosa*. As sufficiently emphasized, I can find no such line of cleavage.

Potentilla fruticosa L., forma **villosissima**, f. nov. (tab. 367), ramulis stipulis foliis utrinque dense albido-villosis, villis subsericiis; caulibus adscendentibus 3–6 dm. altis; foliis plerumque 5–foliolatis, foliolis ad 1.5 cm. longis.—Ontario: limestone pavement and gravel, Great Cloche Island, Manitoulin District, June 29, 1934, *Fernald & Pease*, no. 3382. (type in Gray Herb.).

I hesitate to add to the many described forms of the polymorphic *Potentilla fruticosa*, especially since these numerous variations over the Northern Hemisphere have not been properly systematized. I can find none of the described variations, however, to which the extremely white-villous form of Great Cloche Island can be referred. That it is an ecological form rather than a geographically segregated variety is indicated by its passing very definitely on Great Cloche Island into the less villous or greenish-leaved shrub in the less xerophytic situations. Plate 367 shows typical branches, with an enlarged portion (fig. 2) to illustrate the dense villosity.

P. simplex Michx. See Fern., Rhodora, xxxiii. 188, t. 215, fig. 1 (1931). Ontario: dry ledges along the river, Massey, no. 3383.

Known range in Ontario extended north from shores of Lakes Ontario and Erie.

Geum laciniatum Murr. Comm. Novi. Gott. v. 30, t. 2 (1774); F. Bolle in Fedde, Repert. Beih. lxxii. 55 (1933). *G. virginianum*, var. *Murrayanum* Fern. Rhodora, xxv. 99 (1923).

Bolle, l. c. 71, points out that *Geum virginianum* L. was based on the very distinct southern species which has been known as *G. flavum* (Porter) Bicknell, Bull. Torr. Bot. Cl. xxiii. 523 (1896), a species which has the geographic advantage of occurring in Virginia, whereas the species which has been erroneously passing as *G. virginianum* apparently reaches its southeastern limit in Pennsylvania. In describing *G. virginianum* Linnaeus cited references from his earlier *Hortus Cliffortianus* and from Gronovius and Hermann, and, most fortunately, gave a new diagnosis based upon the material before him. The only specimen in the Linnean Herbarium definitely marked by Linnaeus "H. U. [Hortus Upsaliensis] *virginianum*," the specimen which must stand as the type, is shown in plate 368, made from a photograph supplied by Mr. S. Savage, Assistant Secretary of the

Photo. E. C. Ogden.

GEUM ALEPPICUM: FIG. 2, portion of fruiting head, showing villous achenes, × 4, from Slovakia; FIG. 3, achene, × 10, from East Prussia.

G. ALEPPICUM, var. STRICTUM: FIG. 1, small fruiting plant, × 1, from Vermont; FIG. 4, portion of fruiting head, showing sparsely pubescent achenes, × 4, from Nova Scotia; FIG. 5, achene, × 10, from New Hampshire.

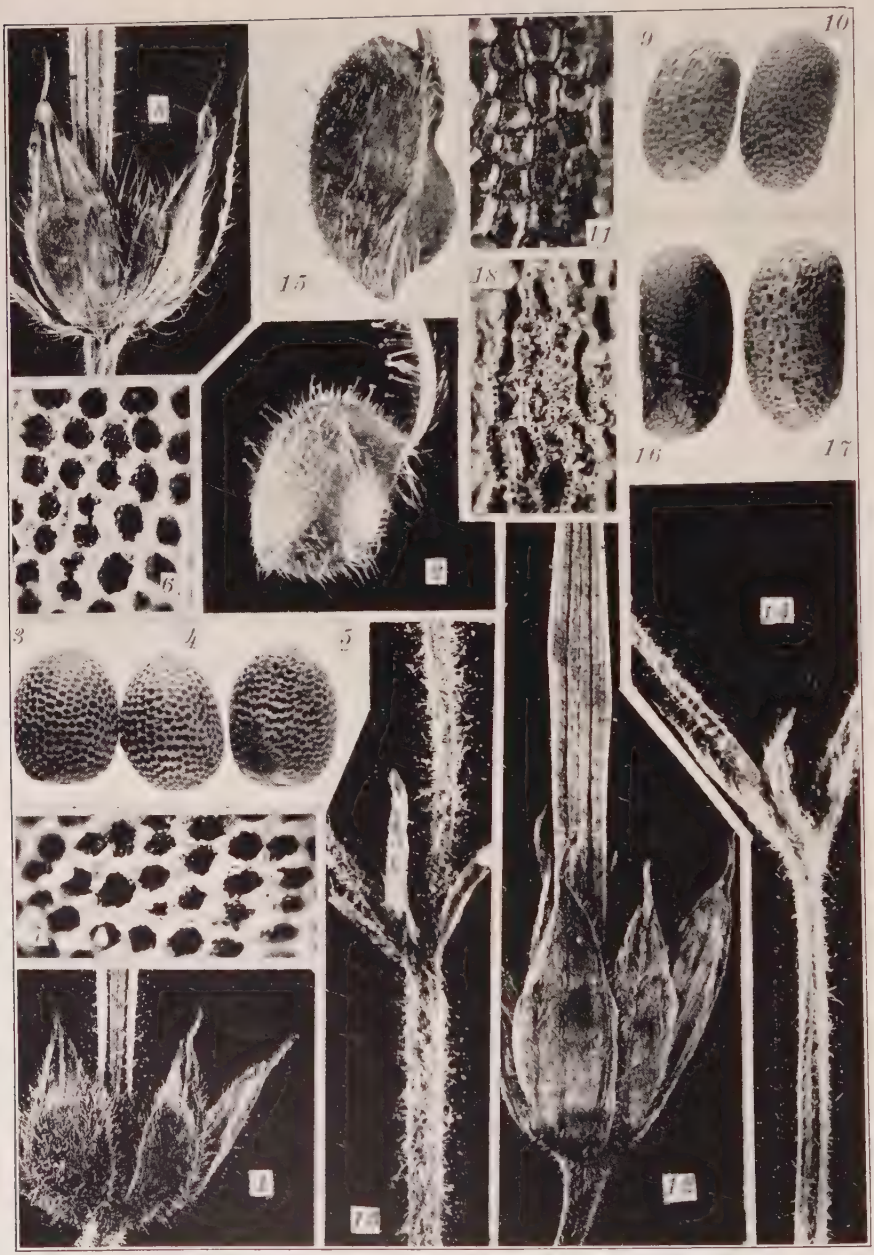


Photo. E. C. Ogden.

GERANIUM DISSECTUM: FIG. 1, calyx, × 5, of *G. laxum;* FIG. 2, carpel-body, × 5; FIG. 3, seed, × 10, from Ireland; FIG. 4, seed, × 10, from Oregon (*G. laxum*); FIG. 5, seed, × 10, from North Carolina; FIG. 6, surface of seed, × 50, from Ireland; FIG. 7, surface of seed, × 50, of *G. laxum.*

G. BICKNELLII: FIG. 8, calyx, × 5; FIGS. 9 and 10, seeds, × 10; FIG. 11, surface of seed, × 50.

G. BICKNELLII, var. LONGIPES: FIG. 12, calyx, × 5; FIG. 13, peduncle and pedicel, × 10, from TYPE; FIG. 14, peduncle and pedicel, × 10, from ISOTYPE of *G. nemorale;* FIG. 10, carpel-body, × 5; FIG. 16, seed, × 10; FIG. 17, seed, × 10; FIG. 18, surface of seed, × 50.

Linnean Society of London. A second sheet, quite different from the first but pinned to it, was not marked by Linnaeus and, therefore, is not specially significant. The only plate cited by Linnaeus under *G. virginianum* (Hermann, Paradisus Batavus, t. 25), although much conventionalized, is not at all inconsistent with the type specimen, either in its characteristic foliage or in its elongate and lax branching. Gronovius gave no original diagnosis, merely copying that of Linnaeus in *Hortus Cliffortianus* and also the reference to Hermann which was also given by Linnaeus.

Since *Geum virginianum* proves to be quite distinct from the coarser and hirsute plant of broader continental range which we have been calling "G. virginianum," we must seek a name for the latter. The earliest name available seems to be G. LACINIATUM Murr., taken up by Bolle. Murray's plant, upon which I based *G. virginianum*, var. *Murrayanum*, has quite glabrous carpels and is generally of more northern range than the bristly-fruited plant which, in 1923, I mistook for typical *G. virginianum*. The latter should be called

G. LACINIATUM Murr., var. **trichocarpum**, var. nov., carpellis supra setosis.—TYPE: swampy woods, Franklin, Connecticut, August 22, 1914, *R. W. Woodward* in Gray Herb.

The variety occurs from Nova Scotia to Ontario (swale at base of gneiss hill, Markstay, Sudbury Distr., no. 3386), south to Pennsylvania and Missouri.

The common North American plant which with us is passing as *Geum strictum* Ait. Hort. Kew. i. 217 (1789) is so nearly identical with the Eurasian *G. aleppicum* Jacq. Ic. Pl. Rar. i. t. 93 (1781–1786) and Coll. i. 88 (1786) that the two, along with some others which often pass as local species, apparently represent one circumboreal and variable specific type. In Europe, recent authors (Ascherson & Graebner, Domin, Bolle) have been reducing the North American (and eastern Asiatic) *G. strictum* Ait. without qualification to *G. aleppicum*. Dr. Eric Hultén, however, maintains *G. strictum* tentatively, saying "The picture given by JACQUIN [our PLATE 369] shows a plant with radical leaves having large rounded slightly lobated terminal leaflet, and several European specimens of the corresponding plant also have similar large basal leaves. Our plant [*G. strictum*] usually has a three-cleft acutely serrated terminal leaflet on the radical leaves, but sometimes leaves occur resembling that illustrated by JACQUIN. They are then small and wither early. As our plant is apparently not quite identical with the European, I prefer to name it

as above, which is in any case correct. The difference between the two plants is certainly not great and after a close study of a large amount of material from Europe, Asia and America it may perhaps prove most rational to unite them under the older name *G. Aleppicum.*"[1]

The difference in basal leaves brought out by Hultén is a character of rather negative value. As he says, typical *Geum aleppicum* (PLATE 369) has the basal leaves with large rounded terminal leaflet, while *G. strictum* often lacks this rounded terminal leaflet but usually has some or all of the radical leaves with more acutely and deeply dissected terminal leaflet. In the large series of North American material before me this character is highly variable. Of the sheets which properly display the radical leaves 75 lack the broad and rounded type which characterizes typical *G. aleppicum* of Eurasia, but 82 have such leaves, some specimens quite lacking the more dissected basal foliage. An average, small North American plant, × 2/5, is shown in PLATE 370, FIG. 1.

After studying typical *Geum aleppicum* from various stations in Armenia, Slovakia, Galicia and Prussia I find one difference which seems to separate true *G. aleppicum* from *G. strictum.* In the former the body of the achene (FIGS. 2 and 3) is long-villous, in the latter (FIGS. 4 and 5) it is smooth except on the margin and summit or only short-pilose. Although the two are apparently conspecific it will make for clarity to recognize the wide-ranging North American and eastern Asiatic plant as

G. ALEPPICUM, var. **strictum** (Ait.), comb. nov. *G. strictum* Ait. Hort. Kew. ii. 217 (1789), as to North American plant described, but excluding synonym *G. aleppicum.* PLATE 370, FIGS. 1, 4 and 5.

PLATE 370 shows a characteristic small plant of *Geum aleppicum*, var. *strictum* (FIG. 1) from Vermont (*E. F. Williams*). FIG. 2 shows a fruiting head, × 2, of typical *G. aleppicum* from Slovakia (*Domin & Krajina*, Fl. Čechoslov. Exsicc., no. 272); FIG. 3, a typical achene, × 10, of *G. aleppicum* from Prussia (*C. Sania*). FIG. 4 is a typical fruiting head, × 2, of var. *strictum* from New Hampshire; FIG. 5 a mature achene, × 10, from New Hampshire.

G. MACROPHYLLUM Willd. MICHIGAN: near Sault Ste. Marie, August 14, 1910, *J. R. Churchill* in Gray Herb.

In his map of the North American range of *Geum macrophyllum*, RHODORA, xxxiii. 175 (1931), Dr. H. M. Raup indicated the occurrence

[1] Hultén, Fl. Kamtch. iii. 77 (1929).

of the species on the Lower Peninsula. Judge Churchill's material is quite typical of *G. macrophyllum*.

G. MACROPHYLLUM, var. PERINCISUM (Rydb.) Raup, RHODORA, xxxiii. 176 (1931). *G. perincisum* Rydb. N. Am. Fl. xxii. 405 (1913). MICHIGAN: in slashings, Turin, Marquette Co., June 24, 1901, *Bronson Barlow* in Gray Herb.

Rydberg included Michigan in his statement of range, and Raup has a dot on the Upper Peninsula, as the extreme eastern limit on his map. The Barlow specimen is here cited that the record may be more definitely localized; the Barlow plant is of the most extreme development of the variety, having both basal and cauline leaves sharply incised.

G. TRIFLORUM Pursh. ONTARIO: savannahs, swales and peaty depressions in the limestone pavement, Great Cloche Island, no. 3387.

Macoun's records and all specimens in the Canadian National Herbarium and the herbarium of the University of Toronto are from southern Ontario.

DRYAS DRUMMONDII Richardson. ONTARIO: on dry cliffs, south side of North Slate Island, Thunder Bay District, *Pease & Bean*, no. 23,629.

The Slate Islands are the only known locality for this characteristic species between the Rocky Mountains and the Gaspé Peninsula (see p. 197). Already reported by Macoun as collected there by Prof. Ellis. The Pease & Bean collection consists of a single typical specimen.

GERANIUM CAROLINIANUM AND ALLIES OF NORTHEASTERN NORTH AMERICA (PLATES 371–374).—In the limestone gravel of Great Cloche Island we collected a plant, there abundant, which looked so unlike either *Geranium carolinianum* or *G. Bicknellii*, the two native small-flowered species conventionally recognized in the general area, that its identification has led to a somewhat extended study of the small-flowered Geraniums occurring in northeastern North America. This study has brought to light some reliable diagnostic characters not heretofore emphasized and it has shown that some of our plants have been passing under erroneous or quite unnecessary names. I am, therefore, here presenting a key to the species involved, with fuller discussion of some of the more critical plants. My grouping of the members of true *Geranium* (excluding *G. Robertianum* from the present discussion) is as follows.

a. Petals 1.4–2.3 cm. long, 0.7–1.3 cm. broad, much exceeding calyx; terminal beak of mature style-column 5–10 mm. long; anthers 2–3 mm. long; perennials with thick crowns and stout rhizomes (*G. maculatum* L., *G. pratense* L. and the casual garden-escapes, *G. ibericum* Cav. and *G. sanguineum* L.).

a. Petals smaller, shorter than to exceeding calyx; beak of mature style-column 0–6 mm. long; anthers 0.5–0.8 mm. long; annuals or biennials (nos. 1 and 7 perennial) with tap-roots. . . . . *b.*

b. Sepals prominently awned or subulate-tipped, the tips 0.7–3 mm. long; seeds with reticulate surfaces. . . . *c.*

c. Peduncles all 1-flowered or terminated by 1 pedicel . . . 1. *G. sibiricum.*

c. Peduncles all or nearly all with 2 pedicels; inflorescences 2–∝-flowered. . . . *d.*

d. Fruiting pedicels much longer than calyx; beak of mature style-column 2.5–6 mm. long.

Pedicels with minute appressed glandless pubescence; carpel-bodies glabrous . . . . . 2. *G. columbinum.*

Pedicels densely glandular-pilose; carpel-bodies hairy . . . . . 3. *G. Bicknellii.*

d. Fruiting pedicels shorter than to slightly longer than calyx; beak of mature style-column 1–2 mm. long. . . . *e.*

e. Carpel-bodies short-hirsute with horizontally spreading hairs; lobes of middle and upper leaves acute; seed strongly reticulate or pitted, with subuniform square or rounded unequally thick-walled pits . 4. *G. dissectum.*

e. Carpel-bodies long-villous with ascending hairs; leaf-lobes obtuse; seeds loosely reticulate with irregular elongate thin-walled areolae or obscurely and subuniformly reticulate.

Larger mature sepals broadly ovate, 5–8 mm. wide, 5-nerved; seed subspherical, 2–2.7 mm. in diameter, faintly reticulate with about 50 rows of small square to rounded areolae . . . . . 5. *G. sphaerospermum.*

Larger mature sepals 3–4.5 mm. wide, 3-nerved; seeds oblong, 1–1.5 mm. thick, with 20–35 irregular rows of loosely elongate areolae . . 6. *G. carolinianum.*

b. Sepals awnless, at most with minute callous tips; seeds smooth or only minutely granular. . . . *f.*

f. Carpel-bodies not cross-wrinkled, finely pubescent; style-column beakless.

Sepals 5–8 mm. long; petals twice as long, deeply notched; carpel-bodies 3–3.5 mm. long, puberulent; fruiting style-column 1.1–1.5 cm. long . . . . . 7. *G. pyrenaicum.*

Sepals 2.5–4 mm. long; petals about as long, shallowly notched; carpel-bodies 2 mm. long, strigose; fruiting style-column 6–9 mm. long . . . . . 8. *G. pusillum.*

f. Carpel-bodies conspicuously cross-wrinkled, glabrous; style-column terminated by a filiform beak 1–2 mm. long . . . . . 9. *G. molle.*

1. G. SIBIRICUM L. Sp. Pl. i. 683 (1753).—Locally naturalized from Eurasia: New York and Pennsylvania to Illinois.

2. G. COLUMBINUM L. Sp. Pl. i. 682 (1753).—Locally naturalized from Europe: New York and Ohio, south to Virginia and West Virginia; South Dakota.

3. G. BICKNELLII (Britton).

Hairs of upper internodes unequal, some long, others short and sometimes gland-tipped; peduncles and pedicels loosely hirsute and with shorter often glandular hairs inter-

Photo. E. C. Ogden.

GERANIUM SPHAEROSPERMUM: FIG. 1, portion of fruiting plant (TYPE), × 1; FIG. 2, calyx, × 5; FIG. 3, carpel-body, × 10; FIG. 4, seed, × 10; FIG. 5, surface of seed, × 50. G. TEXANUM: FIG. 6, calyx, × 5; FIG. 7, carpel-body, × 10; FIGS. 8 and 9, seeds, × 10; FIG. 10, surface of seed, × 50.

GERANIUM CAROLINIANUM
(Reduced from original plate of *Dillenius*).

mixed; calyx unequally ciliate-hirsute on margin and nerves.—Bull. Torr. Bot. Cl. xxiv. 92 (1897).—Open woods, clearings and disturbed soil, Newfoundland to Alberta, south to Nova Scotia, Massachusetts, western Connecticut, New York, northern Indiana and Iowa. PLATE 371, FIGS. 8–11. G. nemorale Suksd. Rhb Fern. Rhod. 43: 35. 1941.

~~Var. longipes~~ (Wats.), comb. nov. Pubescence of upper internodes, peduncles and pedicels more uniform, short and gland-tipped; sepals with shorter gland-tipped ciliation; seeds slightly larger. *G. carolinianum*, var. *longipes* Wats. Bot. King's Expl. 50 (1871). *G. nemorale* Suksd. Deuts. Bot. Monats. xvi. 222 (1892). *G. longipes* (Wats.) Goodding, Bot. Gaz. xxxvii. 56 (1904).—Western Ontario, northern Michigan and Minnesota; Saskatchewan to British Columbia, south to Colorado, Utah and northern California. PLATE 371, FIGS. 12–18.

The western material of *Geranium Bicknellii* seems to be mostly a consistent series, characterized by the comparatively short and nearly uniform mostly glandular pubescence of the upper half of the plant. About the Great Lakes both extremes and numerous transitions occur and I can find no essential differences (except a slight one of size) of seeds between the typical eastern *G. Bicknellii* (FIGS. 9–11) and typical western var. *longipes* (FIGS. 16–18), although there are individual variations in the walls of the alveolae. Though Hanks and Small, N. Am. Fl. xxv. 4–10 (1907) reduce *G. carolinianum* var. *longipes* and the resultant *G. longipes* without question to eastern *G. Bicknellii*, they maintain *G. nemorale* as a distinct species, *G. Bicknellii* described with "peduncles glandular-villous," *G. nemorale* separated by "peduncles retrorsely pubescent." A portion of a peduncle from the TYPE (*Watson*, no. 206) of *G. carolinianum* var. *longipes* is shown in FIG. 13, × 10, one from an ISOTYPE (*Suksdorf*, no. 2028) of *G. nemorale* in FIG. 14, also × 10; I see no specific nor other characters to separate them.

4. G. DISSECTUM L. Cent. Pl. i. 21 (1755). *G. laxum* Hanks in N. Am. Fl. xxv. 9 (1907).—Somewhat adventive in the Eastern States; generally naturalized from Europe on the Pacific slope. PLATE 371, FIGS. 1–7.

Although the common plant of the Pacific slope has generally been recognized as an early and rapidly spreading introduction from Europe, Hanks & Small treat it as an endemic American species "resembling *G. dissectum*." In their key *G. dissectum* is assigned "Seeds pitted" as contrasted with *G. laxum* with "Seeds reticulate"; *G. dissectum* with "carpel-bodies pubescent with minute spreading hairs," *G. laxum* with them "glandular-pubescent." In the fuller

diagnoses, however, we find under *G. dissectum* "carpel-bodies 2–2.5 mm. long, glandular-pubescent," while *G. laxum* (which in the key had them "glandular-pubescent") in the diagnosis has "carpel-bodies 2–2.5 mm. long, hirsute." The difference is not clear, unless it is to be found in the "pitted" seed of *G. dissectum*, the "reticulate" seed of *G. laxum*. Dr. Gleason has most kindly lent me the type and a number of authentic sheets of *G. laxum*. They are of the characteristic western American introduced plant. Seeds from *G. laxum* of western North America, × 10, and their markings, × 50, are shown in PLATES 371, FIGS. 4 and 7, similar enlargements of seeds of European *G. dissectum* and of the weed introduced in eastern America are shown in FIGS. 3, 5 and 6. No essential difference is apparent.

5. G. **sphaerospermum** sp. nov. (TAB. 372, FIGS. 1–5). Annuum vel bienne, *G. carolinianum* simulans; caulibus simplicibus vel ramosis ramis adscendentibus, 1–4.5 dm. altis minute retrorseque albido-pilosis; foliis reniformi-orbiculatis 2–7 cm. latis profunde 5-partitis, segmentis apice lobatis lobis obtusis; inflorescentiis terminalibus confertis umbelliformi-corymbosis; pedunculis pedicellisque minute retrorso-pilosis valde abbreviatis; sepalis late ovatis manifeste mucronatis accrescentibus maturis 5–8 mm. latis 5-nerviis, nervis margineque piloso-hirsutis; petalis roseis sepalis subaequantibus; columnis stylorum maturorum 1–1.5 cm. longis piloso-hirsutis, apice rostratis, rostro subulato 1–1.5 mm. longo; valvulis longe villosis, villis adpresso-adscendentibus; seminibus subsphaericis 2–2.7 mm. diametro obsolete reticulatis, areolis ca. 50-seriatis quadratis vel rotundatis.—Limestone gravel and rich clearings, Ontario to Washington, south to northern New York, South Dakota, Montana and northern California. The following have been examined. ONTARIO: sur les calcaires du Lac Constance, South March, 4 juillet 1922, *Victorin*, no. 15,912; Whitby, August 13, 1915, *L. V. Baker* (herb. Univ. Toronto); savannahs, swales and peaty depressions in the limestone pavement, Great Cloche Island, June 29, 1934, *Fernald & Pease*, no. 3405 (TYPE in Gray Herb.). NEW YORK: rocky banks (calcareous), Black River below Watertown, June 27, 1922, *House*, no. 8925 in part (mixed with and distributed as *G. Bicknellii*). SOUTH DAKOTA: Whitewood, alt. 4500 ft., Black Hills, July 7, 1892, *Rydberg*, no. 585; near Old Fair Grounds, Limestone, Black Hills, July 6, 1909, *J. Murdoch, jr.*, no. 3532; moist ravines, Deadwood, July 19, 1913, *Carr*, no. 67. SASKATCHEWAN: wheat-field west of Yorktown, July 7, 1906, *Herriot* in Herb. Geol. Surv. Can., no. 70,864; Thomas Lake, August 19, 1906, *Herriot* in Herb. Geol. Surv. Can., no. 70,864. MONTANA: Seely Lake (near Knopp place), August 6, 1924, *Kirkwood*, no. 1837; Bozeman, September 5, 1901, *W. W. Jones*. WASHINGTON: Clark Springs, Spokane, July 10, 1902, *Kreager*, no. 132. CALIFORNIA: Berry Cañon, Butte Co., May 8, 1902, *Heller* (apparently belongs here, too young

for final identification). All, unless noted, distributed as *G. carolinianum.*

Geranium sphaerospermum is at once separated from *G. carolinianum* (PLATES 373 and 374) by its very broad and 5-nerved sepals, its essential lack of glandularity and by the entirely different seed, *G. carolinianum* having elongate seeds with a loose reticulation of elongate areolae (PLATE 374, FIGS. 3–5, 7 and 8). Whereas *G. carolinianum* is of broad range across the southern United States, barely reaching north into southernmost Canada and occurring in sterile, circumneutral to acid sands and gravels, *G. sphaerospermum* is a Canadian calcicolous species. At its type locality, on Great Cloche Island, it was associated with a notable and characteristic group of calcicoles: *Equisetum variegatum, Bromus Kalmii, Agropyron trachycaulum, Eleocharis compressa* and *pauciflora* var. *Fernaldii, Carex sterilis, C. scirpoidea* var. *convoluta, C. vaginata, C. eburnea, C. concinna, C. Crawei, C. capillaris, Juncus alpinus* var. *rariflorus, Tofieldia glutinosa, Arenaria stricta, Ranunculus fascicularis, Geum triflorum,* etc. Similarly, the ledges of the Black River, where House got *G. sphaerospermum,* have long been famous for their localized northern calcicoles; it was there or near-by that Crawe, nearly a century ago got *Geum triflorum,* the first and last collection in New York State.

In its subspherical seed with abundant, subuniform, small alveolae, *Geranium sphaerospermum* suggests *G. dissectum* (PLATE 371, FIGS. 1–7) and *G. texanum* (Trel.) Heller (PLATE 372, FIGS. 6–10). Both these species have very small sepals as compared with *G. sphaerospermum* and their seeds are very prominently pitted or reticulate, the alveolae of the newly proposed species barely discernable. In outline of the sepal and its tendency to 5 nerves *G. texanum,* endemic in southern Texas and adjacent Mexico, so far as is known, is the nearest approach to *G. sphaerospermum.* Besides by its small and glabrous (except on the nerves) sepals (FIG. 6) and sharply reticulate seeds (FIGS 8–10) *G. texanum* is characterized by its solitary peduncles scattered in the forks of the stem and by the almost glabrous surface of the carpel-body (FIG. 7). Both *G. texanum* of southern Texas and *G. sphaerospermum* of southern Canada and the northern States are very remote in their characters from *G. carolinianum,* with which they have both been confused.

6. G. CAROLINIANUM L. Internodes, petioles, peduncles and pedicels densely retrorse-hirsute with subuniform hairs mostly less than 0.5 mm. long mixed (on pedicels) with short glands; peduncles solitary in the upper forks or loosely aggregated in 4–12-flowered terminal

corymbs.—Sp. Pl. 682 (1753). *G. atrum* Moench, Meth. 285 (1794). *G. lanuginosum* Jacq. Hort. Schoenb. ii. 8 (1797). *G. Langloisii* Greene, Pittonia iii. 171 (1897).—Dry rocky woods, fields and waste places, Florida to southern California, north to Massachusetts, Connecticut, West Virginia, southern Michigan, Illinois, Missouri, Kansas, Wyoming, Idaho and southern British Columbia. Plate 373, and 374, figs. 7 and 8.

Var. **confertiflorum**, var. nov. (tab. 374, figs. 1–6), laxe villoso-hirsutis pilis plerumque 1 mm. longis; inflorescentiis terminalibus confertis umbelliformi-corymbosis 5–25-floris.—Dry rocky or sandy soil, southern Maine to Wisconsin, south to Delaware, uplands of North Carolina and Tennessee, and Missouri. Type: open field, North Amherst, Lorain Co., Ohio, June 22, 1924, *R. J. Webb*, no. 5263 in Gray Herb.

Var. *confertiflorum*, the northeastern extreme of the species, has been passing as typical *Geranium carolinianum*. It is not represented in the Gray Herbarium from either of the Carolinas except from the mountains of North Carolina. It was obviously this northern plant which Greene visualized as *G. carolinianum* when he segregated as a distinct species *G. Langloisii*, the common southern extreme, "canescent with white hairs, these deflexed on the stem, . . . gland-tipped hairs wholly wanting, but the inflorescence minutely glandular . . . distributed as *G. Carolinianum;* but that species has a different mode of growth, a gland-tipped and viscid spreading pubescence," etc. Similarly in the North American Flora, Hanks & Small separate the two in their key as follows:

Inflorescence open, few-flowered . . . . . 8. *G. Langloisii.*
Inflorescence compact, many-flowered . . . . . 9. *G. carolinianum.*

Geranium carolinianum of Linnaeus was thus defined:

carolinianum. 34. GERANIUM pedunculis bifloris, calycibus aristatis, foliis multifidis, pericarpiis hirsutis. *Roy. lugdb.* 351. *Gron. virg.* 78
Geranium columbinum carolinum, capsulis nigris hirsutis. *Dill. elth.* 162. *t.* 135. *f.* 162.
Habitat in Carolina, Virginia. ☉.

Royen simply referred to the Dillenian description and plate cited by Linnaeus, as did Gronovius who, however, cited a Clayton specimen (no. 372). The Dillenian *Geranium columbinum carolinum* from which the specific name and first locality, Carolina, were obviously derived by Linnaeus, was well and fully described and clearly illustrated. The plate of Dillenius, slightly reduced is here reproduced as our plate 373. That it is the southern plant described as *G. Langloisii*, with "Inflorescence open, few-flowered" rather than the more north-

Photo. E. C. Ogden.

GERANIUM CAROLINIANUM, var. CONFERTIFLORUM: FIG. 1, portion of fruiting plant (TYPE), × 1; FIG. 6, calyx, × 5; FIG. 2, carpel-body, × 10; FIGS. 3 and 4, seeds, × 10; FIG. 5, surface of seed, × 50.

G. CAROLINIANUM: FIG. 7, seed, × 10; FIG. 8, surface of seed, × 50.

Photo. E. C. Ogden.

VIOLA SEPTENTRIONALIS, var. GRISEA: FIG. 1, fruiting plant (TYPE), × 1; FIG. 2, base of expanding leaf, × 10; FIG. 3, cleistogamous fruit, showing ciliate sepal-auricles, × 10.

eastern plant with "Inflorescence compact, many-flowered" (var. *confertiflorum*) is evident.

7. G. PYRENAICUM Burm. f. Sp. Geran. 27 (1759). Adventive from Europe: roadside-ditches near Quebec and very locally elsewhere.

8. G. PUSILLUM Burm. f. l. c. (1759). Naturalized from Europe: Massachusetts to southern British Columbia and southward.

9. G. MOLLE L. Sp. Pl. 682 (1753). Adventive from Europe: chiefly in lawns and grass-land, Nova Scotia to British Columbia and southward.

CEANOTHUS OVATUS Desf., var. PUBESCENS T. & G. MICHIGAN: wind-swept crests, crevices and talus of sandstone-conglomerate, West Bluff, Keweenaw Co., no. 3414; sandy barrens west of Norway, Dickinson Co., no. 3415.

The glabrous, typical *Ceanothus ovatus* is well represented from Michigan; I find no records for var. *pubescens*.

C. SANGUINEUS Pursh. MICHIGAN: wind-swept crests, crevices and talus of sandstone-conglomerate, West Bluff, Keweenaw Co., no. 3416; dry, deciduous woods at base of greenstone and calcareous conglomerate bluffs, east of Eagle Harbor, no. 3,417 (shrubs up to 3 m. high).

Recorded from the same general area (Copper Harbor) by Farwell, RHODORA, xvii. 230 (1915). Otherwise very local east of the Pacific Slope. See p. 209 and MAP 6.

VIOLA SEPTENTRIONALIS Greene, var. **grisea**, var. nov. (TAB. 375), foliis lanceolato-deltoideis vel anguste lanceolato-ovatis utrinque griseo-pilosis.—MICHIGAN: dry sandy plain near Driggs, Schoolcraft Co., July 2, 1934, *Fernald & Pease*, no. 3430 (TYPE in Gray Herb.).

Superficially *Viola septentrionalis*, var. *grisea* is so similar to *V. novae-angliae* House that, without close examination, it could readily pass as that species. It has, however, the characteristic capsule and strongly ciliate sepal-auricles (FIG. 3) and the seeds of *V. septentrionalis* and gray pilosity such as is not found in *V. novae-angliae*. Its pubescence is that of the common eastern *V. septentrionalis* but much denser (FIG. 2), whence the name, and its leaf-blades much narrower than in the characteristic eastern plant.

(*To be continued*)

TILLAEA AQUATICA ON LONG ISLAND.—This little plant of brackish shores has been reported from New York State only from the banks of the Hudson River near Peekskill (House, Bull. N. Y. State Museum

254. 375 (1924)). It was therefore interesting to find it growing on tidal mud in the Carman River near South Haven (*Svenson* no. 6397). —H. K. Svenson, Brooklyn Botanic Garden.

NOTES ON THE NORTHERN RANGE OF ZIZANIA IN MANITOBA

A. I. Hallowell

In the course of an ethnological study of the Saulteaux Indians of the Berens River, conducted during the past three summers, the writer has collected a considerable amount of ethno-botanical data. The river mentioned rises in Ontario, flows northwestward and empties into Lake Winnipeg at approximately 52° 20′ N. Lat. The band of Indians farthest up the river inhabits the neighborhood of Lake Pekangikum (Ont.) some 260 miles from the mouth. A second band, the Grand Rapids group, occupies the district midway between the Pekangikum band and the Berens River band proper, located at the mouth of the river.

Among the other items *Zizania aquatica* L., although not as important today as formerly, is a food plant well known to all of these Indians. This use of *Zizania*, paralleled by many American natives elsewhere, would scarcely be worth recording in a botanical journal were it not for the fact that data obtained on the precise localities where the plant flourishes in abundance, seems to indicate that it grows somewhat farther north than has hitherto been reported in this area. Many years ago, for example, when Prof. A. E. Jenks published his "Wild-Rice Gatherers of the Upper Lakes"[1] he included data obtained from botanists and the botanical literature on the geographical range of *Zizania*. He stated its northern limits to be approximately 50°.[2] Even in the "Check List of Manitoba Flora" issued by the Botany Department of Manitoba Agricultural College, 1922, the only locality specified for *Zizania* is Sturgeon Creek, in the southern part of the Province. Yet until recently the native Indians of various localities east of Lake Winnipeg and almost as far north as 53° have been annually harvesting the plant and utilizing it as one of their staple foods for many years.

My personal interest in the range of *Zizania* grew out of the ques-

[1] Bureau of American Ethnology, 19th Annual Report, 1900.
[2] Op. cit. Part 2, p. 1028.

tion which arose in my mind as to whether the Indians made use of it throughout its limits. Consultation with Dr. J. M. Fogg, Jr. and correspondence with Dr. Hugh M. Raup made it seem worthwhile to record the information I had secured from the Indians, despite the fact that I have not myself observed *Zizania* in all of the localities mentioned below. My principal informant, I might add, was Chief Williams Berens, of the Berens River Band, an exceptionally intelligent Indian, who has travelled widely throughout the country east of Lake Winnipeg, especially between 52° and 54° N. Latitude. According to his observations, *Zizania* does not range as far north as the last mentioned degree, the latitude of Norway House. I visited this locality in 1930 and can testify that the Cree Indians of this district make no use of *Zizania*, a fact which in itself has no botanical value, although it is consistent with Chief Berens' statement. The latter also asserted that no wild rice grows on the canoe route between Norway House and Island Lake to the east, a distance of some 175 miles, at approximately the same latitude. This negative observation is also supported by my own inquiries at Island Lake in 1930, which disclosed no utilization of the grain there by the Saulteau-speaking natives.

Turning now to positive information as to the occurrence of *Zizania*, the following localities are those in which the plant grows in sufficient abundance to have made it worthwhile for the Indians to harvest the grain. Formerly, several of these were visited exclusively for this purpose, although not to-day. In a forthcoming publication I shall indicate these localities on a map. For the purposes of this note, approximate references to degrees of latitude and longitude will have to suffice.

1. In a number of small lakes and creeks on Chief Berens' hunting ground, none of which are named on official maps (Lat. 52° 35′, Long. 96° 30′) *Zizania* grows in abundance. In 1933, he said, there was sufficient wild rice to feed "three or four battalions of men."

2. A lake which, in the native tongue, is known as the "wild-rice gathering place." (Lat. 52° 35′, Long. 96°) is another well-known locality. The Indians of the Poplar River band (north of Berens River) used to frequent this lake for the purpose of harvesting *Zizania* as did members of the Little Grand Rapids band of the Berens River.

3. On the Berens River itself wild rice is fairly abundant from the mouth of the river as far inland as Long Lake (Lat. 52° 10′, Long. 96° 5′), a distance of some 60 miles. Long Lake is likewise the approxi-

mate boundary between the hunting grounds of the Berens River band proper and the Little Grand Rapids Indians.

4. In approximately the same general locality the Etomami River enters the Berens River at Etomami Falls.[1] Above the falls and along the river as far as a fairly large lake *Zizania* grows in abundance. Some of the Grand Rapiders used to gather their wild rice here, since farther up the river it is said to be absent. When I visited Lake Pekangikum in 1932, I found that these Indians did not utilize *Zizania* at all, although they knew its nutritive properties. I was told that it did not grow in sufficient quantities anywhere within their habitat to enable them to exploit it economically. This negative economic fact is reflected by the absence, in their calendrical terminology, of a "wild rice gathering moon" which is to be found in the terminology of the other two bands, as well as among wild rice gatherers of the Great Lakes.

Native place-names, sometimes continued in English translation, are likewise legitimate clues to the occurrence of *Zizania*, because a Wild Rice River or Lake would not be so named by the Indians unless it had reference to the presence, and probably economic exploitation, of the plant in such a locality. I wish, therefore, to call attention to the following localities south of the Berens River which Chief Berens believed to be those exploited by the Indians of the Blood Vein and Hollow Water River bands.

5. Rice River, a small stream which enters Lake Winnipeg from the east at 51° 15′ N. Latitude.

6. Rice Lake (51° Lat., 95° 31′ Long.)

It would appear from this brief survey that, like their Ojibwa cogeners to the southeast, the Saulteaux Indians east of Lake Winnipeg utilized *Zizania* whenever it occurred within their habitat and even made considerable journeys at times to harvest the grain in neighboring localities. While not enlarging the range of *Zizania* in any precise botanical detail the data presented unequivocally indicate that its limits exceed 50° N. Lat. in Manitoba and that there is legitimate doubt whether the plant occurs in any abundance, if at all, beyond 53°.

Department of Anthropology,
University of Pennsylvaniza.

[1] Not to be confused with the junction of the same river and the Berens River much nearer the mouth.

Lichen Flora of the United States.[1] The publication of this long awaited book should fill a serious gap in the botanical literature of the United States. Not since the time of Tuckerman has a work of this scope been attempted, and for the first time adequate keys are provided to the lichen flora of the entire area. The volume was started by Professor Fink along the same lines as his earlier publication, *The Lichens of Minnesota*,[2] and was completed after his death in 1927 by his assistant, Mrs. Joyce Hedrick Jones. Many of the plates are taken from the previous work as is also the introduction which has, however, been brought up to date. In all, 178 genera and 1578 species, varieties, and forms are represented. In the description of species only the diagnostic characters are given, thus eliminating a great deal of the needless repetition of generic characteristics found in the *Lichens of Minnesota*. More space could profitably have been spent on the ranges of species, and some of the ranges stated are open to question as, for example, that of the almost ubiquitous *Evernia prunastri* which is said to occur "from Washington to California." However, even the brief ranges given show very emphatically how much collecting needs to be done before any real knowledge of the distribution of the various species can be arrived at. No mention is made of the distribution of species outside of the United States. The nomenclature follows that of Zahlbruckner with minor changes. Fink's species-concept was much more conservative than that of many lichen investigators and his condensation of *Cladonia* into only 65 species and a few varieties and forms is a most refreshing shelter from the torrential shower of names which threatens to engulf the beginner in this most perplexing genus. The excellence and the modest price of this work should bring numerous new students into the field of lichens and cause a revival of interest in this neglected group.—S. K. Harris.

Victorin's Flore Laurentienne.—It is a most noteworthy event when a country which has never had available proper texts on its own flora, except as prepared "over the line," should in a short space of time have two books by its own sons. The little *Flore-Manuel de la Province de Quebec* by Father Louis-Marie was noted in Rhodora, xxxiv. 19, 20 (1932). Now we heartily welcome the much more extended book[3] on the same area by the senior taxonomist of French Canada. This volume, a sumptuous quarto, is not merely a flora. Its preliminary sections give a very clear physiographic account of the Province of Quebec (in its full extent including much of the Labrador Peninsula) and detailed accounts of the Région Laurentinne, or the terrain drained by the St. Lawrence. Even this area, less than one-third of the Province, is a vast one, and the botanically more interesting eastern half of it (the Gaspé Peninsula, Anticosti, the Côte Nord, the Mingan Islands and the Magdalen Islands) is unfortunately omitted, except in the general phytogeographic discussions—unfortunately, since this area is not already covered by any manual.

[1] Bruce Fink. *The Lichen Flora of the United States*. 426 + v pp. 47 plates. University of Michigan Press, Ann Arbor, Michigan. 1935.

[2] Cont. U. S. Nat. Herb. xiv, pt. 1. 1910.

[3] Frère Marie-Victorin: *Flore Laurentienne*, illustrée de 22 cartes et de 2800 dessins par Frère Alexandre: 917 pp. Cloth, $5.00; half-leather, $6.50; half-sbagreen, with corners and cords, $7.50; postage, .50. De La Salle Press, 949 Côté Street, Montreal, Quebec.

In a brief notice it is impossible to cover all the features of this new book. The brief history of botanical exploration of the region and the phytogeographic discussions will be of great interest to botanists of all eastern North America; and numerous maps illustrating the geological history of the region are conveniently brought together. Since some of the latter are, naturally, chiefly derived from other sources than the author's own studies, it would have helped those who would like to follow up such matters if the slight space necessary had been allowed for reference to the geologists and others from whom these maps were primarily drawn. For those who already know the sources such information is unnecessary, but by most users of the book it would be welcomed.

In the major work the order of families will be unfamiliar to most users, for the system of Wettstein is largely followed. The placing of the Dicotyledons before the Monocotyledons, a procedure now frequent, will cause no special embarassment; but botanists who were brought up on the system of Bentham & Hooker and then that of Engler & Prantl will be disconcerted by certain juxtapositions: the *Euphorbiacea* between the *Caryophyllaceae* and the *Hamamelidaceae;* the *Aristolochiaceae* and the *Sarraceniaceae* in the same order with the *Ranunculaceae;* the *Droseraceae* in the order with the *Violaceae;* the *Empetraceae* in that with the *Ericaceae;* and the wind-pollinated *Typhaceae* treated as the grand evolutionary climax of the Monocotyledons, much higher in development than the tremendously specialized *Orchidaceae.* The lack of finality in the classification of these (and other) groups becomes evident when we note that Hutchinson, in a hypothetical system still later than that of Wettstein, puts the *Euphorbiaceae* 83 families away from the *Caryophyllaceae* and 15 (with the *Leguminosae* in between) from the *Hamamelidaceae;* the *Aristolochiaceae,* the *Sarraceniaceae* and the *Ranunculaceae* in different orders (as in the systems of Bentham & Hooker and of Engler & Prantl), the *Droseraceae* in the *Sarraceniales* (not in the *Violales*), the *Empetraceae* 43 families away from the *Ericaceae,* and the *Typhaceae* 21 families lower in his system than the *Orchidaceae.* In view of the purely hypothetical and largely unsettled phylogeny of many groups and the very different positions assigned them by different theorists, would it not have been advantageous for the users of the *Flore Laurentienne* if the author had followed one of the more generally familiar sequences?

Within the larger families of plants there is great diversity, but careful students of world-wide material have organized the genera into tribes, distinguished by certain fundamental structures. Thus, in the *Compositae,* the tribes, worked out with breadth of knowledge and precision by Bentham, are based on very deep-seated morphological differences; and these tribes have been generally accepted (by Bentham & Hooker, by Engler & Prantl, by Wettstein, and in North America by Gray, Britton and essentially all others). It seems, therefore, a retrograde step to ignore (or perhaps not to have understood) the tribes in a volume meant to reflect a scientific viewpoint. In the *Flore Laurentienne* the genera of *Compositae* (*Tubuliflorae*) are thus grouped (without the tribal designations which are here appended):

Bidens (*Heliantheae*)
Arctium (*Cynareae*)
Centaurea (*Cynareae*)
Tanacetum (*Anthemideae*)
Artemisia (*Anthemideae*)
Antennaria (*Inuleae*)
Anaphalis (*Inuleae*)
Gnaphalium (*Inuleae*)
Petasites (*Senecioneae*)
Erechtites (*Senecioneae*)
Senecio (*Senecioneae*)
Silybum (*Cynareae*)

Cirsium (*Cynareae*)	Achillea (*Anthemideae*)
Eupatorium (*Eupatorieae*)	Anthemis (*Anthemideae*)
Galinsoga (*Heliantheae*)	Rudbeckia (*Heliantheae*)
Heliopsis (*Heliantheae*)	Tussilago (*Senecioneae*)
Helenium (*Helenieae*)	Arnica (*Senecioneae*)
Helianthus (*Heliantheae*)	Inula (*Inuleae*)
Madia (*Heliantheae*)	Solidago (*Astereae*)
Chrysanthemum (*Anthemideae*)	Erigeron (*Astereae*)
Matricaria (*Anthemideae*)	Aster (*Astereae*)

The separation of genera of the *Heliantheae*, the *Cynareae*, the *Anthemideae*, the *Inuleae* and the *Senecioneae* by members of other tribes is a novel feature in a work of scientific pretensions and presumably the result of their chance position in the artificial key.

With the exception of these very striking departures from general sequence, the floristic treatment is conservative and essentially conventional. Only the species (without designation of varieties and forms) are described and practically every one is illustrated in a series of coördinated drawings, reproduced at the tops of many pages. The keys and descriptions are simple but, apparently, adequate; the drawings clear and generally of excellent workmanship. Several of the latter are ingeniously diagrammatic and a number are singularly familiar. The latter are explained in the Préface: "en certains cas on s'est aidé d'illustrations déjà publiées."

Following the Latin names are the French and the English. Many of us have noted the deficient imaginations of Americans of Anglo-Saxon stock, with the resultant poverty of good colloquial names for our plants; but evidently the reputedly more imaginative French Canadian has not yet produced an extensive set of such folk-names. "Claytonie de Caroline," "Montia à graines luisantes," "Aristoloche clématite" and "Ménisperme du Canada" are not indigenous names of the people but literal translations respectively of *Claytonia caroliniana*, Spring Beauty of the English, *Montia lamprosperma*, Water Chickweed or Blinks of the English, *Aristolochia Clematitis*, Birthwort of the English, and *Menispermum canadense*, Moonseed of the English. In some cases, however, good colloquial names are given: Petits Cochon and Herbe-crapaud for *Sarracenia purpurea*, Pruche for *Tsuga canadensis*, Merisier for *Betula lutea*, Bois-sent-bon for *Myrica Gale*, Petards for *Silene Cucubalus*, Gants du Notre-Dame for *Aquilegia*, Savoyane and others for *Coptis groenlandica*, Carcajou for *Dentaria diphylla*, Quatre-temps for *Cornus canadensis* and others equally good; but that such conspicuous plants as our Ground Pine, Cinnamon Fern, Christmas Fern, Sensitive Fern, Ostrich Fern, Blue Cohosh, Squirrel Corn, Black Locust, Indian Pipe, Harebell, Cardinal-flower, Joe-Pye-weed and Pickerel-weed should have no names among the country people of Quebec seems very strange.

Brother Victorin has had the aid of former students in the elaboration of certain groups: *Crataegus* has been very successfully worked out by M. Jules Brunel; the artificial key to families is by M. Jacques Rousseau and so are the treatments of *Viola* and *Astragalus*. But in the main the work is the result of Victorin's own industry and the outcome is one of which he, his countrymen and his friends outside of Canada may be proud.—M. L. F.

Praeger's Botanist in Ireland.—No more readable and elucidating works on floristic botany have been available than the books and articles of Robert Lloyd Praeger. Now the series is continued and enriched by *The Botanist in Ireland*.[1] Beautifully printed and with abundant photographs of characteristic and botanically significant habitats and with many colored and detailed maps, the book sets a standard difficult to excel. The first sentence of the Preface, "Ireland is a pleasant country for the botanist," gives the key-note; and as one peruses the pages and studies the lists of typical species, the pictures and the maps, he is inclined to add, "also an intensely interesting country." In a brief notice details can hardly be given. Geological history, topography, climate and all the physical and chemical features of the region which can have an influence on the flora are well discussed; the specially interesting or rare plants of Ireland (including *Potentilla fruticosa, Veronica peregina, Utricularia intermedia, Sisyrinchium angustifolium, Juncus macer* (*J. tenuis* of authors), *Najas flexilis, Eriocaulon septangulare, Scirpus nanus* and *Rynchospora fusca*) are given particular attention; and the Island and its vegetation is then dissected into small and natural areas under which the local floras are more fully presented. That the flora is not strictly European nor made up only of specialties like those noted above is apparent when it is found that more than 600 of the species are also in our flora of the northeastern United States. Every botanist who is interested in seeing something outside his own local haunts will want the book; then he will want to visit Ireland.—M. L. F.

Listera australis on Long Island.—This small orchid is of wide distribution in the southern states, extending northward to southern New Jersey, and then reappearing in northern New York from Cayuga to St. Lawrence Counties (Metcalf & Griscom, Rhodora xix. 52 (1917)), and is also known from Ottawa, Canada (House, Bull. N. Y. State Mus. **167.** 26 (1913)). Its sole New England station is the one discovered by Mr. Horsford in Vermont (Rhodora xxiv. 187 (1922)). Mr. Edward A. Behr and the writer found a dozen plants of this species flowering in leaf mold in a tupelo and *Liriodendron* swamp at Manorville on May 30, 1931. Specimens are in the Gray Herbarium and the herbarium of the Brooklyn Botanic Garden.—H. K. Svenson, Brooklyn Botanic Garden.

[1] Robert Lloyd Praeger. *The Botanist in Ireland*. 587 + xii pp.; 44 plates, many figs. Dublin. Hodges, Figgis & Co. 12s. 6d.

Volume 37, no. 439, including pages 229–268 and plates 356–362, was issued 6 July, 1935.

NOTICE TO SUBSCRIBERS

Subscription revenue covers less than one-half the total cost of publication of RHODORA. The strictest economy will be necessary to permit future publication on the same modest scale as has obtained in recent years.

About one-third of our subscribers file their renewal orders through commercial subscription agencies which habitually deduct 10% from every remittance as a commission.

Many remittances reach the management in the form of drafts or checks which are subject to bank collection and exchange charges of varying amounts, owing to Clearing House rules.

Beginning January 1, 1932, the subscription rate to RHODORA will be $2.00 *net* per annum payable in Boston or New York funds or their equivalent (i. e. drafts or postal money orders which are collectible in Boston at par). All subscription orders from agencies must be accompanied by remittances at the *net* rate without deduction. Hence all subscribers who require the convenience of agency service must regard the subscription rate to RHORORA as $2.00, plus the charges of agents.

NOTICE TO CONTRIBUTORS

IN accordance with the Editorial Announcement of March, 1931, that RHODORA will follow the provision of the International Rules of Botanical Nomenclature, that the publication of names of new groups will be valid only when they are accompanied by a Latin diagnosis, contributors are notified to see that all new species or other groups proposed by them for publication in RHODORA have Latin diagnoses. If desired by contributors, the Editorial Board of RHODORA will undertake (with charges at cost for matter of considerable length) to have their English diagnoses converted into Latin.

DUPLICATE BOOKS FOR SALE

Ball, J. Notes of a Naturalist in South America. Cloth. pp. 416. 1887 ..... **$ 6.00**

Blakeslee and Jarvis. New England Trees in Winter. Illus. 1911. Cloth ..... **$ 1.50**

Dame and Brooks. Typical Elms and other Trees of Massachusetts. Introductory chapter by Oliver Wendell Holmes. Folio with 58 plates. pp. 89. 1890 ..... **$ 6.00**

Harshberger, J. W. The Botanists of Philadelphia and their work. 1899. 457 pp. 48 pl. mainly portraits ..... **$ 2.00**

Prices do not include cost of transportation.

Address Librarian,

GRAY HERBARIUM of HARVARD UNIVERSITY,

Cambridge, Mass.

Early Volumes of Rhodora

A limited number of the earlier volumes can still be supplied. Libraries and other subscribers needing to complete their sets should communicate with LUDLOW GRISCOM, Museum of Comparative Zoology, Cambridge, Mass.

For Sale: The following works:

Batchelder, F. W. Preliminary List of Plants ... of Manchester, New Hampshire. 1909. 59 pp. ..... $ .50

Chestnut, V. Poisonous Plants of the United States. 1898. 60 pp., 34 figs. ... .25

Tuckerman & Frost. Catalogue of Plants ... within thirty miles of Amherst College. Pp. vi + 98. 1875 ..... 1.00

Coulter, J. M. Manual of the Botany of the Rocky Mountain Region. 1885. xvi + 454 + 28 pp. ..... .75

Coville, F. V. Botany of the Death Valley Expedition. Contr. U. S. Nat. Herb. vol. IV. viii + 362 pp., 21 pl., map. 1893. Cover missing 1.25

The above are perfect as to contents, but in some cases the covers are discolored or dirty:

Address Librarian, New England Botanical Club,
Gray Herbarium, Cambridge, Mass.